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COMPILATION

OF

NARRATIVES OF EXPLORATIONS IN ALASKA.

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NARRATIVES OF EXPLORATIONS IN ALASKA.

Mr. Carter, from the Committee on Military Affairs, to whom was referred resolution No. 189, agreed to December 9, 1897, directing that "The Committee on Military Affairs be, and is hereby, directed to investigate and report to the Senate at the earliest practicable date the extent to which the Territory of Alaska has been explored by the Army of the United States; and what, if any, aid the Army may be able to lend in opening, protecting, and maintaining the regular lines of communication exclusively within the territory of the United States from tide water to the interior of said Territory; and what measures may, with propriety, be adopted to avert hostilities with and to secure the friendly cooperation of the native population of said Territory in developing the resources thereof," respectfully submits the following report:

The committee has deferred completion of its task under the command of the resolution until the present time for the purpose of securing and incorporating in it reports of military exploring expeditions which were sent to Alaska by the Secretary of War during the year 1899. Such reports have been but recently submitted. The report herewith presented will be found to embrace in narrative form an account of the expeditions of Raymond, 1869; Howard, 1875; Petrof, 1880; Schwatka, 1883; Ray, 1884; Abercrombie, 1884; Allen, 1885; Ray, 1897; E. Hazard Wells, 1897; Ray and Richardson, 1898; Abercrombie, 1898; Glenn, 1898, 1899; Richardson, 1899; Abercrombie, 1899; Lieutenant Herron, 1899.

This material mainly consists of records of the several expeditions into Alaska under the direction and control of the military arm of the Government, beginning with that of Lieutenant Raymond in 1869 and closing with the expeditions of Abercrombie, Glenn, and Richardson in 1899. The reports of these explorations and reconnoissances of military explorers in Alaska are here for the first time presented in connected narrative form.

The committee cheerfully acknowledges its indebtedness to the War Department for valuable assistance, freely given, in supplying and arranging the material for the report. It is confidently believed that the report will prove of general interest and historic value, in addition to its usefulness for reference in connection with contemplated legislation. The story of each member of the respective expeditions who has left a record is tersely told. It is believed that this report will prove to be the most comprehensive that has thus far been undertaken by the Government in reference to Alaska, and that it will do much to make accessible the sum of our present knowledge of this extensive portion of the public domain of the United States.

GENERAL INTRODUCTION.

Alaska was discovered a little over a century ago by Russian fur hunters. Sailing east from the coast of Siberia they first came upon the Aleutian Archipelago, which they took possession of in the name of the Czar. Having established themselves on these islands, and having thoroughly subjugated and partially christianized the docile natives, they pushed farther east, found and explored the extensive coast of the mainland, and, after many hard fights with the warlike tribes of those regions, established ports along Berings Sea and the North Pacific. The Russian Government granted to these early adventurers special rights in regard to the territory which they had discovered for the Crown. Thus was the foundation laid of the famous Russo-American Company that held almost undisputed sway over Alaska until it was purchased by the United States in 1867 through the foresight, diplomacy, and wisdom of Hon. William H. Seward, then Secretary of State.

Under the suffrage of the Emperor of Russia the company named enjoyed positive power, and, for over half a century, ruled the country with a rod of iron. Not only did it have absolute right over the territory, but over everything except the unexplored regions of the far interior, and the many tribes of free savages therein who recognized no master. This company was engaged in the coast trade, and, it is alleged, used every effort to prevent the Russian Government from learning the value of its possessions. All search after minerals was prevented and all enterprise in that direction stifled. Nothing was made public except such affairs connected with the fur trade as the company saw fit to permit to be published. But the time was near at hand when Alaska was no longer to be, as it had been almost from the beginning of time, practically a terra incognita.

GENERAL ROUSSEAU'S MISSION.

Soon after the cession of the Territory to the United States General Rousseau, in behalf of the Government, proceeded from Fort Vancouver to Sitka, where he met the representatives of the Czar, and received formal possession of the ceded country and its outlying stations then occupied by the Russians. These stations were notably Fort Kenai, on the Kenai Peninsula; Kadiak, on Kadiak Island; Sitka, on Baranof Island, and Fort Wrangell, near the mouth of the Stickine River. At the date named the interior of the Territory was generally believed to be a valueless wilderness. The only object of commercial interest at that time was the fisheries along the coast, with such fur as the natives brought from the interior. After a few years' occupation by the military it was considered that a man-of-war would prove more efficacious in looking after the Indians, and in guarding such commercial interests as were then scattered along the coast from Unalaska to Fort Wrangell. The territory thus acquired was practically transferred to the Treasury Department, which gave it a fatherly supervision. The first serious step taken to ascertain something of the interior of the country was instituted in 1869 by the Department of War in ordering a reconnoissance by Captain Raymond, of the Engineer Corps, who by direction of the Secretary of War ascended the Yukon River to settle a mooted question as to whether Fort Yukon, a station of the Hudson Bay Company, was in the domain of Great Britain or was embraced in the Territory of Alaska.

SETTLEMENT OF THE FRONTIER.

It is proper to state in this connection that since the foundation of our Government the lines of the Army have advanced simultaneously with the advance of the settler along our vast frontiers. Since the adoption of our Constitution it has been the uniform policy of the Government to foster the development of the country by exploring and opening up trails for emigrants and prospectors, convoying their supplies, aiding in the transmission of their mail, in all things extending a helping hand to them, and in keeping step with the advance of American civilization. Among the early explorers we find inscribed on the annals of our country's history the imperishable names of Bonneville, Lewis and Clarke, Mullen and Fremont, and a host of others who explored and, with the aid of friendly Indians, blazed a trail for the overland emigrant route to Oregon and California. Following in the wake of these enterprising, energetic, and courageous explorers, a chain of small military stations were established for the pioneer and used by him as havens of rest and succor, as he literally fought his way from a narrow strip of land on the Atlantic coast to the vast shores of the Pacific. Proceeding westward across the lakes to Fort Dearborn, now the site of the imperial city of Chicago, the emigrant wended his way across the fertile prairies of Illinois and Iowa, thence to Fort Omaha, on the Missouri River, en route to California. Passing through the Platte valley to Fort Harney, and from thence up the eastern slope of the Rocky Mountains to Fort Russell, the hardy emigrant toiled his way over the mighty Rockies, then almost insurmountable. To-day these mighty upheavals of the earth only represent a night's journey behind the iron horse. The Rockies surmounted, there was spread out before the dauntless emigrant a panoramic view of the great valley of the Salt Lake through which he passed, and in due time reached Fort Douglas. The next step was the crossing of Nevada and entering California, leaving behind Fort Bidwell. Climbing the Sierras, the adventurous emigrant debouched into the fertile Stockton Valley, where his ears were greeted by the mighty roar of the surf of the Pacific as it unceasingly beat on the shores, where the army had, in anticipation of his coming, constructed Fort Yuba, the site of which is now known as the commercial city of San Francisco.

Later on the emigrant is found with his ox team and prairie schooner paralleling the former line of march across the continent by crossing the Mississippi at Fort Snelling, the site of which is to-day the capital of Minnesota, St. Paul. In crossing the State of Minnesota, he was next seen entering the upper Missouri Valley in the vicinity of Fort Abraham Lincoln. Passing up this valley he left behind him the cantonment at the mouth of the Poplar River, entered the Yellowstone valley and passed Fort Keogh, Fort Custer, Fort Ellis, and later Fort Harrison before crossing the Rocky Mountains. To the west of this range, following the Mullen trail, he passed Fort Missoula, Fort Cœur de Alene, and proceeded on his journey until he finally reached the fertile valley "where flows the silent Oregon." Passing Fort Dalles, the weary traveler after much toil and suffering and the braving of many dangers, at last found rest for his weary feet at Fort Vancouver. Thus it was that in those primitive days the eastern emigrant spanned the continent.

Wherever he went he found that somewhere or somehow the military branch of the Government had with wise, unerring foresight established posts for his protection and relief. The Army of the United States has always been the advance guard of civilization on this continent. Wherever it has gone its protection has been freely given to every American citizen. The deeds of that Army, its patient perseverance in summer's heat and winter's snow, needs no special eulogy in these pages. Undaunted by danger, never faltering when the country's honor was at stake, and never swerving from the duty of the hour, it has uncomplainingly toiled to render life more enjoyable to all the citizens of our common country. But for the Army it is questionable whether the vast domain, now peopled with millions of inhabitants beyond the Mississippi, would have been developed as rapidly and to the extent this generation finds it to-day.

THE MINING EXCITEMENT OF 1849-50.

In the fall of 1849 and 1850 the world at large was electrified and thrown into a state of feverish excitement by the marvelous discovery of placer gold in the mill tail of Sutter's mill in the Sacramento Valley. The character developed, the hardships endured, the many crimes incident thereto, are all matters of history. Military and naval commanders who played well their part in assisting the argonauts in developing California have long since passed away. Following, with an interval of some fifteen years, we learn of the richness of Confederate and Alder gulches in the Territory of Montana, where the military are found, pursuing the uniform policy of the Government, quartered at Fort Shaw, Fort Ellis, Fort Logan, Fort Maginnis, and Fort Missoula. Another lapse of a score or more of years and we hear of coarse gold being found on the Kootenai in the Cœur d' Alene mountains. At a time almost coincident with this period we learn of the vast fortunes that were being made and lost in the Northwest Territory of Canada in the diggings of the Cassiar, Dease Creek, and last, but not least, though more recent, in the Klondike. In these operations hundreds of thousands of dollars of gold dust were taken from the earth, making rich the favored few upon whom fortune smiled, while the millions representing the frugal savings of thousands were willingly disbursed in prospecting, exploring, and developing the country.

While at first these hoardings of years would appear to have been squandered in a vain endeavor to better the financial condition of the emigrant, such in reality has not always proved the case. Towns sprang up, many of which were abandoned. Railroads were constructed, some of which never paid a dividend. But in the wake of these stampedes always followed the thrifty husbandman who, by his judgment, foresight, and energy, reaped the golden harvest that had lured his more excitable brother westward sometimes to disappointment, and oftentimes despair. The gold seekers left their mark upon the face of the country in which they toiled. They blazed a path for the more prudent settler and thus, unconsciously, but nevertheless surely, gave an impetus to the great work of national development.

Following closely in the footsteps of the emigrant came the capitalist, ready to seize on points of commercial value, and struggling hand in hand with the military to penetrate the territory of the aborigine with the steamboat and locomotive. From St. Louis, Mo., to Fort Benton, on the Upper Missouri, we find the packets plying their trade to supply the hardy prospector long ere the iron horse was able to pierce the country of the buffalo and the Indian. Following in the trend of "Westward, Ho!" comes the financial operation of that master mind, Jay Cooke, who projected, with the financial aid given him in land grants, that great trunk line that is to-day known as the Northern Pacific. Here again we find the military acting as convoy to the civil engineers in the projection and survey of a line of railroad that made possible the clasping of hands between the pioneer of the Pacific coast and his kinsman of the Atlantic.

It is about this period that the world becomes familiar with the geographical terms of "Columbia River," Puget Sound," and a transcontinental railroad. Having reached the occident, the emigrant is apparently left without a visible means of plying his vocation, namely, the further exploration of the Great West. For the first time he is now made acquainted with the portion of our national domain lying far to the north, where rumor tells him that untold wealth is hidden in the bowels of the earth. He discusses in his log cabin with his family and his friends the possibilities of penetrating and developing our northern frontier known as Alaska. But how to reach that far-distant country is the great problem presented. What assurance has he that should he wrest from this unknown region a competency for himself and for those who have shared in his hardships and discoveries, that his life and theirs and his property will be protected by the strong arm of the law? He knows that he has a legal right to enter this domain, but he is uncertain as to who will extend a hand of friendship in case of dire necessity. He soon learns, if he has not learned it already, that the military, on which he has depended in the past, has been withdrawn from the Eldorado which he desires to seek. He learns that at Wrangell, Sitka, and Kodiak there formerly existed military stations, but these have long since been abandoned. A few of the more hardy adventurers, who have wended their way far northward into the Dominion

of Canada, tell him of the mighty valley of the Yukon, of the Chilkoot Pass, and of the seductive possibilities that region offers in the way of discovery. He hears of the famous Treadwell mines, located on the coast of our northern frontier, and of other alleged discoveries. Again, he learns of rich placer discoveries on various tributaries of the great artery of central Alaska, the Yukon River. These reports, meager though they be, tend to excite the enterprising brain of the old "Forty-niner" who, having reached the shores of the great Pacific, was for a time forced to abandon the conquest of unexplored regions and to accept the conditions of the moderate every-day life of a settled community.

Late in the fall of 1896 the mining world was electrified by that same magical influence that carved deep into the pages of history the name of Marshall, the discoverer of auriferous deposits under the wheel of Sutter's mill. The zone of excitement is now transferred to the valley of the Yukon River. In the lonely cabins on the slopes of the Sierras, in the hamlet of the sheep herder of the great plains, in the busy lobbies and corridors of the hotels of the great cities of the Atlantic seaboard, and in every commercial center of Europe, are heard those thrilling terms, which appeal to the ranchman, the prospector, the mill operator, and the capitalist alike, "The Klondike," "Gold Creek," "Chilkoot Pass." All appeal to the excited imagination of the silent toilers of the various marts of civilization and give voice to the flattering prospect of rapid acquirement of wealth which means ease and comfort to the weary toiler and the banishment of the wolf from the threshold of cabin and tenement.

GOVERNMENT AID.

While extensive explorations had been previously made in Alaska by the Army, it remained for the great gold discoveries in the Upper Yukon, with the rush of miners thereby occasioned, to call forth an order which marked the beginning of regular and continuous operations by the Army in the work of policing and opening up the interior of the country for permanent settlement.

The order referred to is as follows:

GENERAL ORDERS, No. 6.

HEADQUARTERS DEPARTMENT OF THE COLUMBIA,
Vancouver Barracks, Wash., February 18, 1898.

With the approval of the Acting Secretary of War, a military district to be known as the District of Lynn Canal is hereby established, embracing Lynn Canal, in southeastern Alaska, and all lands adjacent thereto, extending to the international boundary and within 50 miles in other directions.

Col. Thomas M. Anderson, Fourteenth Infantry, is assigned to the command of said district.

By command of Brigadier-General Merriam:

THOMAS H. BARRY,
Assistant Adjutant-General.

The rapid growth of trade on the Yukon River and the necessity for the protection of life and property required the establishment of a military post at the mouth of that stream in 1897.

The order establishing the reservation at St. Michael is as follows:

GENERAL ORDERS, No. 59.

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE,
Washington, October 20, 1897.

The following orders from the War Department are published for the information and guidance of all concerned:

"WAR DEPARTMENT,
"*Washington, October 20, 1897.*

"1. By authority of the President, the land known as St. Michael Island, Alaska, with all contiguous land and islands within 100 miles of the location of the flagstaff of the present garrison on that island, is set aside from the public lands of the Territory of Alaska and declared a military reservation.

"Parties who have, prior to the receipt of this order, located and erected buildings on the land so reserved will not be disturbed in their use of lands, buildings, and improvements, nor in the erection of structures needed for their business or residence.

"2. The military reservation above declared, and the military post located thereon, will be known as Fort St. Michael, and will be under the control and supervision of the commanding officer of the troops there stationed.

"R. A. ALGER, *Secretary of War.*"

By command of Major-General Miles:

SAML. BRECK, *Adjutant-General.*

These orders mark the revival of the time-worn policy of our Government that has always sent its soldiers to the rescue of the citizen on the frontier.

The following order is self-explanatory:

[Telegram.]

WAR DEPARTMENT, WASHINGTON, *August 4, 1897.*

Capt. P. H. RAY,
Eighth Infantry, Seattle, Wash.:

The President sends you, with Lieutenant Richardson, to the Alaska gold field, to which so many are flocking, to investigate and report, as fully and frequently as you can, the condition of affairs and make such recommendations as you may deem best. Make your first headquarters at Circle City and change location as you may find advantageous. The following points especially to be covered in your report:

Are troops necessary there, and if so, for what purpose; where should they be located, how outfitted, and what facilities for communication with the coast settlements are practicable in winter?

Are the civil authorities affording reasonable protection to life and property?

Are the people disposed to be law-abiding or otherwise?

Where are the people locating, and in what numbers, and what is the probable degree of permanence of the different settlements?

Is there food in the country for the population to winter there?

These and all other subjects—military, civil, and commercial—that will be of use and interest will be covered by your investigations. Keep constantly in mind the importance of having your reports accurate and reliable. Observe carefully and accurately. Do not form hasty judgments or make hasty reports. The President has sent you in confidence of your ability and as a means of information to him. You are expected to justify this confidence.

By order of the President:

R. A. ALGER, *Secretary of War.*

Rumored starvation at Dawson City resulted in action by Congress and the War Department in 1897 as set forth in the following orders:

GENERAL ORDERS, No. 74.

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE, *Washington, December 28, 1897.*

The following act of Congress is published for the information and government of all concerned:

AN ACT authorizing the Secretary of War, in his discretion to purchase subsistence stores, supplies, and materials for the relief of people who are in the Yukon River country, to provide means for their transportation and distribution, and making an appropriation therefor.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of two hundred thousand dollars is hereby appropriated out of any money in the Treasury not otherwise appropriated, to be expended (or so much thereof as may be necessary) in the discretion and under the direction of the Secretary of War for the purchase of subsistence stores, supplies, and materials for the relief of people who are in the Yukon River country, or other mining regions of Alaska, and to purchase transportation and provide means for the distribution of such stores and supplies: *Provided,* That with the consent of the Canadian Government first obtained, the Secretary of War may cause the relief herein provided for to be extended into Canadian territory.

That the said subsistence stores, supplies, and materials may be sold in said country at such prices as shall be fixed by the Secretary of War, or donated, where he finds people in need and unable to pay for the same.

That the Secretary of War is authorized to use the Army of the United States in carrying into effect the provisions of this Act, and may, in his discretion, purchase and import reindeer and employ and bring into the country reindeer drivers or herders not citizens of the United States, or provide such other means of transportation as he may deem practicable. The said reindeer or other outfit may be sold and disposed of by the Secretary of War when he shall have no further use for them under the provisions of this Act, or he may turn over the same or any part thereof to the Department of the Interior, and the proceeds arising from all sales herein authorized shall be covered into the Treasury.

SEC. 2. The Secretary of War shall make report in detail to Congress at the beginning of its next regular session as to all purchases, employments, sales, and donations or transfers made under the provisions of this Act.

Approved, December 18, 1897.

By command of Major-General Miles:

H. C. CORBIN, *Acting Adjutant-General.*

The rumors proving groundless, this proposed expedition did not proceed farther than the head of Linn Canal.

AN ALL-AMERICAN ROUTE.

The object of these two expeditions is best explained by the following general orders:

GENERAL ORDERS, No. 8.

HEADQUARTERS DEPARTMENT OF THE COLUMBIA,
Vancouver Barracks, Wash., March 16, 1898.

Pursuant to telegraphic instructions from Headquarters of the Army, dated March 5, 1898, the following expeditions for exploring purposes in Alaska are announced:

I. *Expedition No. 1.*—Consisting of Capt. Bogardus Eldridge, Fourteenth Infantry, commanding; Second Lieutenants Elmer W. Clark and Robert Field and 20 enlisted men Fourteenth Infantry; Capt. D. L. Brainard, commissary of subsistence, as quartermaster and commissary; First Lieut. Franklin M. Kemp, assistant surgeon; Acting Hospital Steward John G. Abele and 2 privates Hospital Corps; guides to be employed as needed, fully equipped and supplied to June 30, 1898; about 384 reindeer, with proportional number of sledges and drivers, fully equipped and supplied to August 31, 1898, will proceed to Pyramid Harbor or Haines Mission, Alaska, not later than the 24th instant, and via the Dalton trail to Dawson, Northwest Territory, thence to vicinity of Belle Isle, Alaska, and there establish a military camp and depot.

The expedition will proceed thence to discover, explore, and mark a trail from the Yukon up Forty Mile Creek to the Tanana River. It will also explore for other practicable routes southward from the Yukon between Belle Isle and Circle City to the Tanana. Its district of exploration will not be limited except by the valley of Forty Mile Creek on the south, the Yukon on the east and north to Circle City, and the Tanana River on the west. It will also endeavor to communicate with expeditions Nos. 2 and 3.

II. *Expedition No. 2.*—Consisting of Capt. W. R. Abercrombie, Second Infantry, commanding; First Lieut. Guy H. Preston, Ninth Cavalry; First Lieut. P. G. Lowe, Eighteenth Infantry; Second Lieut. R. M. Brookfield, Second Infantry; 15 enlisted men Fourteenth Infantry; Acting Hospital Steward John W. Cleave and 2 privates Hospital Corps; Alfred W. Gumaer and J. J. Rafferty guides, and 1 geologist, fully equipped and supplied to June 30, 1898, and 50 reindeer, with proportional number of sledges and drivers, fully equipped and supplied to August 31, 1898, will proceed about the 1st proximo to Valdes Inlet, Alaska, there establish a camp and depot and explore the valley of the Copper River and tributaries to the Tanana River, establishing a line of communication to the junction with Expedition No. 1 on the Tanana River. Its district of exploration will be the valley of Copper River and its tributaries and the country north to the Tanana River. It will also endeavor to communicate with expeditions Nos. 1 and 3.

III. *Expedition No. 3.*—Consisting of Capt. E. F. Glenn, Twenty-fifth Infantry, commanding; First Lieut. Henry G. Learnard and 19 enlisted men, Fourteenth Infantry; Second Lieut. J. C. Castner, Fourth Infantry; First Lieut. John S. Kulp, assistant surgeon; Acting Hospital Steward Arthur Neville and 2 privates Hospital Corps; George H. Howe, guide and interpreter; Luther S. Kelly, clerk; and 1 geologist, fully equipped and supplied to June 30, 1898; 50 reindeer, with proportional number of sledges and drivers, fully equipped and supplied to August 31, 1898, will proceed to Fort Wells, Prince William Sound, Alaska, about the 1st proximo, there establish a camp and depot and explore northeastward and northwestward for routes toward Copper and Sushitna rivers. This expedition will be ready to reembark about May 1, 1898, for Cook Inlet, thence to explore northward and endeavor to discover the most direct and practicable route from tidewater to one or more crossings of the Tanana River, in the direction of the Yukon, between Forty Mile Creek and Circle City. It will also endeavor to communicate with expeditions Nos. 1 and 2. Its district of exploration will be the route indicated and the country north between that and the Tanana and Yukon rivers. Passes through the Alaska Mountains, south of the Tanana, should be discovered if existing.

IV. As much territory as possible will be covered by each expedition, especially between the Yukon, Tanana, Copper, and Sushitna rivers, and all information will be collected and embodied in the reports that may be valuable to the development of the country, regarding topographical features, available routes of travel, feasible routes for railroad construction, appropriate and available sites for military posts, mineral resources, timber, fuel, products, capability of sustaining stock or animals of any kind, and the animal best suited for service in that country in winter and summer. Maps and, when practicable, photographs will accompany all reports. Small parties should be detached from the main expedition to explore the tributaries of streams and localities not covered by the main party.

V. The commanding officer of each expedition is authorized to enlist not to exceed 50 Indians (natives of Alaska) for duty with his expedition, for periods of six months or less.

The Quartermaster's Department will furnish the necessary transportation.

By command of Brigadier-General Merriam:

THOMAS H. BARRY, *Assistant Adjutant-General.*

As a result of the effort of the War Department to foster the development of, and gather information bearing on the topographical features of that vast area with a view of ultimately constructing a military trail as an avenue of travel to and from the interior, we find the points of vantage now garrisoned by the troops of the Regular Army to be as follows: Company B, Fourteenth Infantry, 1 officer and 49 men, stationed at Dyea, Alaska; Company H, Fourteenth Infantry, 1 officer and 50 men, stationed at Fort Wrangell, Alaska; Battery A, Third Artillery,

and a detachment of the Eighth Infantry, 2 officers and 81 men, stationed at Circle City, Alaska; detachment of the Third Artillery, 2 officers and 77 men, stationed at Fort St. Michael; 1 quartermaster agent and relief station of Alaska Exploring Expedition No. 2 stationed at Port Valdez, Alaska; detachment of Fourteenth Infantry and relief station of Alaska Exploring Expedition No. 3, ——, Alaska.

THE NATIVE POPULATION.

The Indian of Alaska is radically dissimilar from the aborigine of the plains. Prior to our occupation of Alaska the Russians had disciplined the Indians to such an extent that the Aleutes, inhabiting the coast from Prince William Sound to the Seal Islands, were a tribe only in name. Farther to the south, however, in the Alexander Archipelago, the home of the Thlinket, we find a race of men more analogous in custom and disposition to what is commonly known as the North American Indian. This Indian was never wholly conquered by the Russians, and it was only after a severe chastisement at Kilisnoo, where one of their villages was completely razed to the ground by the bombardment of one of our naval vessels, that this Indian acknowledged the authority of the Federal Government. In the great Yukon Valley, taking the Indians as a whole, we may class them as friendly to the whites. It is only in isolated instances that they have resented the oppression of the Russian and even gone so far as to murder. It is extremely doubtful, however, whether any act of violence was wholly unprovoked and of a wanton character. Owing to the severity of climatic conditions, in the increase of his kind the Alaska Indian has never been very prolific. From all of the information contained in the reports of the various officers who have come into contact with him during the last thirty years, we find that his race, as a whole, is on the wane.

The native population of the great Yukon Valley, while not definitely known, is estimated to be in the neighborhood of from some 4,000 to 7,000 souls, while those residing in the Copper River and Sushitna valleys will not swell this figure to exceed 1,000. The primitive customs and mode of habitation of the Alaska Indian are fast disappearing. The bow and arrow of the more primitive period is now the toy of the young boy rather than an implement of warfare or the chase. The buck, who was formerly classed as a warrior, will now be found possessed of the latest repeating rifle with an ample supply of ammunition. His raiment is largely that of the white man. While formerly his means of support were those supplied by the chase, in trapping furs and catching fish, the arrival of the white man in the section of the country in which he lives has led the native to almost entirely abandon his former mode of life and seek the labor market opened to him and his family by the prospector and miner in packing provisions and other goods from the main lines of travel into the more remote mining districts being opened up in that Territory. Just what the result of this contact between the white man and the native will be is extremely hard to forecast. The rule of the Russian in regard to the introduction of spirituous liquors was well-nigh absolute, and to such an extent have the natives adhered to this edict of the Czar, forbidding the introduction of spirituous liquors into Russian America and substituting therefor the beverage of that part of the country, tea, that most of the Indians of Alaska residing in the interior did not know five years ago the taste of intoxicating liquor.

The history of our Indians in Alaska points to many things wherein the white man's dealing with the natives might have been, to say the least, more judicious. That history will repeat itself in the white man's dealing with the native of Alaska there can be very little doubt. His disposition toward the white man entering his territory during the season of 1898 was in general one of friendliness and hospitality. Wherever the prospector appeared in distress the Indian was, with few exceptions, ever ready to lend a helping hand. Instances are numerous where the native has gone miles out of his way to notify a white man whose boat had been wrecked in navigating some mountain torrent, or that he had recovered a portion of a white man's food supply and placed it in safety in some tree on the river bank near where it had been found. The frequent inquiry made by him as to when the great ruler of the white man who lives far to the south will come with the others to visit him is pathetic. It is beyond his comprehension that a country can exist that contains a greater population than the vast number of white people that have entered

the Territory of Alaska during the past season. It is the universal recommendation of the army officers who have visited this section of our country that the Alaska Indian should be generously dealt with.

The timber of Alaska, covering as it does the greater part of that area now being developed by the prospector, may be said, as a whole, to be of great value. The most valuable timber in the district is to be found along that portion of the seacoast washed by the Japan Current, or at least greatly affected by its proximity and influence. Owing to the extraordinary precipitation, the conditions are most favorable for the growth of timber. On the shores and islands of Prince William Sound, on the Kenai Peninsula, and on the shores of Cook Inlet are found the Sitka spruce of very considerable growth. Passing through the Coast Range into the interior, we find a lesser growth, reported as a species of Norway spruce. This tree attains a growth of from 15 to 18 inches in diameter, while in favored localities may be found trees of far greater magnitude. Passing through central Alaska to the main range of mountains, we find that the cottonwood and birch are much in evidence, the former attaining a diameter averaging from 18 to 24 inches, while the latter will probably average from 14 to 16 inches. Passing through this range of mountains into the Yukon Valley, the growth of the timber shows the severity of the climate. Crossing the Yukon Valley, this feature becomes more marked, until, passing into the Arctic Circle, the timber of the north is reached. Regarded as a product for commercial exportation, the timber of the interior of Alaska, while requisite to fill all the wants for the ordinary building purposes of that section for the present, will probably never be in commercial demand for export. For railroad construction, bridging, spar timber, and other like purposes this product is ample for the requirements of the Territory for many years to come.

AGRICULTURAL RESOURCES.

The agricultural possibilities of Alaska are not of a pronounced character. But those who are familiar with the country believe that with a guiding hand, pointing out to the small farmer the most desirable districts for the location of his new home, the soil will, in the near future, supply the wants of the mining population of that section with a domestic production of breadstuff that will in a measure, if not wholly, render the population self-sustaining.

Of the garden products usually grown by the ordinary farmer, we have substantial proof that the soil of this section is not only capable of but does produce, and under the most favorable circumstances, a variety of tubers and berries that is extremely encouraging agriculturally. It is believed with the establishment of a few experiment stations in the Copper River and Sushitna River valleys, in order that the different character of the soil may be tested and intelligently reported upon by the General Government, would be of great value. To the Northern farmers this section of central Alaska would seem to contain a most attractive field of operation in the manipulation of hay and stock ranches. Here will be found thousands and thousands of acres of the choicest red-top hay waiting for the scythe and hay press to put it in marketable form. The berries indigenous to the soil are very abundant.

NATURAL HISTORY.

The natural history exhibits of the district of Alaska embrace most of the northern mammals. The great elk of the Cook Inlet district and the great brown bear of the Prince William Sound district are probably the two most notable denizens.

Of birds, their name is legion. All of the migratory tribe, from the humming bird to the great white swan, visit annually this section.

In insect life, strange as it may appear, we find the honey bee, butterfly, wasp, and other winged insects, the most numerous of which is the omnipresent mosquito. Insect life usually begins about the middle of June and ends the last of September. While insects are abundant and extremely annoying, it is not thought that they are more numerous than in other portions of the continent where climatic conditions are favorable to their propagation.

Of fish, we find in the streams the entire salmon family, with the salmon trout and grayling in the greatest abundance. In some of the larger lakes of the Yukon Valley we find the pickerel and other varieties.

Of the fur-bearing animals, the evidence of their occupation is more often met with than the animal itself. The life of this animal is said to be markedly on the decline.

The most notable feature in Alaska is the absence of the horse. Although we have a practical demonstration of his usefulness and find him almost a necessity in the development of the country by the prospector, very few horses up to date have been taken into the interior. Those that have been taken there, when selected from the hardy breed of northern Idaho and Montana, known as the range pony, render good service, and seem to adapt themselves to the climate very readily. The pernicious attacks of insects do not appear to materially worry the range horse, as they do animals who have been raised under dissimilar conditions. One of the features of the coming season in Alaska will be the introduction of the range pony and the all-American route.

The development of routes of travel into the interior of Alaska have been, to within the past few years, extremely slow. The one route of travel, prior to the mining excitements that have brought this country prominently before the public, was that up the Yukon River. The ocean steamers making annual trips to the mouth of the Yukon to receive the season's catch of furs and deliver the articles of trade for the following season were there met by one of the two small stern-wheel steamers which annually ascended the Yukon River to barter with the Indians who came from various points of the interior to meet it. From year to year the adventurous prospector crossed the rugged Chilcoot Pass, and taking advantage of the current that drifted him down the mighty Yukon from its head waters in Lake Bennett, finally established another route into the interior. As the wants of the traveling public were meager, so were the facilities for transportation, until the discovery of precious metals in large quantities demanded more extensive accommodations to provide for the increased volume of trade. As necessity required, devices were plenty for transporting the traveling public and their supplies from the coast to the interior; all of which, however, were short-lived, as it was found that when the storm king of the Arctic came south with his icy breath the feeble efforts of man were temporarily paralyzed, and all traffic during the winter season over the mountain passes had to be suspended. Lives were lost by the score. Avalanches of snow swallowed up entire parties, marking the season of 1898 as one of death and disaster to the traveling public into Alaska. Early in the season of 1898 two additional routes of travel were reported as practicable, one via Cook Inlet and the Midnooski River into the lower Tanana Valley, and the other via the Copper River Valley to the head waters of the Tanana, through Forty Mile and Birch Creek districts, to the Yukon River.

METEOROLOGICAL.

The meteorological data presented herewith, while mainly collected from various stations along the coast of the Gulf of Alaska and the Arctic Ocean to the north, shows the precipitation from Sitka to Unimak Island, the southern extremity of the Alaskan peninsula, to be abnormal. At Sitka, on Baranof Island, we find an average of 300 rainy and cloudy days out of the 365 each year. These humid conditions of constant fog and precipitation are met along the coast up to within the Arctic Circle. Passing through the Coast Range Mountains that form the iron-bound coast, we find the atmospheric conditions radically changed. The dry, bracing climate prevailing in Montana, Colorado, and Idaho is here encountered. The precipitation in the great valleys of the Yukon, Tanana, Shushitna, and Copper rivers during the months of July, August, September, and October will be found to be confined to occasional showers in the earlier part of the season, with almost constant sunshine during the middle portion, and occasional snow squalls as a reminder of the coming winter in the latter part of September and through the month of October. This does not apply, however, to the mountains and adjacent foothills, which, as a rule, are glacial; and owing to the cold storage thereon deposited render erratic precipitation to

be expected while in their vicinity. The temperature of the southern coast of Alaska, with the exception of that district represented by the environment of Cook Inlet, very rarely drops lower than 10° below zero as a minimum, while 85° during the summer season may be considered the maximum. Passing through the Coast Range, we find the summer temperature somewhat higher, the thermometer having registered 110° F., with an average of 15° below as a minimum for the winter months. Crossing the main range of mountains which divide the Shushitna and the Copper River valleys from the central drainage of Alaska, 30° of cold may be added to the minimum for the winter months for the Tanana and Yukon valleys, while the summer temperature remains about the same, with probably a slight advantage in favor of the Shushitna and Copper River basins as to the length of the summer season.

THE MINERAL PRODUCTS.

The development of the mineral products of the district of Alaska have been materially retarded owing to the absence of a guiding hand to assist the prospector in his research, such as has been extended in the neighboring mineral district of the Northwest Territory. Auriferous indications have been found in almost all streams having their inception in what is locally known as the Tanana hills that drain in the Tanana and Yukon rivers through the agency of the Forty Mile and Sixty Mile rivers and Birch Creek to the north, while along the head waters of the Tanana and the various tributaries emptying into this river have been found gravels carrying more or less pay dirt, while farther to the westward, among the rugged McKinley range of mountains which apparently parallel the lower portion of the Tanana, come vague rumors of mineral deposits. In almost every creek and river flowing to the Copper and Shushitna River valleys favorable indications are found in the auriferous-bearing gravels. In the main range of mountains at the head waters of the Copper River have been discovered argentiferous quartz deposits of a promising character. The development of this mineral product, however, has as yet hardly been considered by the prospector, owing to the exceedingly expensive means of transportation that are at the operator's disposal for transporting his product from the mine to the seaboard. Large deposits of coal, some of which are reported of great commercial value, have been reported as existing in the Copper River Valley and on the shores of Cook Inlet. Valuable deposits of iron are believed to exist adjacent to these coal beds, while extensive deposits of copper have been reported to have been found embedded in the main range of the Coast Mountains.

TOPOGRAPHICAL FEATURES AND ROUTES.

Apparently the one absorbing topic of conversation discussed and debated by the citizens of the United States interested in the development of the interior of Alaska is why can not we American citizens be given an all-American route to our seaboard and our distant homes in the States. Why should we be compelled to pay tribute to a foreign nation for developing our own domain? As the result of over thirty years' exploration and research by the War Department, the choice of lines of travel over American territory into the interior of central Alaska points to three different routes. The most northern and heretofore most extensively used is that from the Pacific coast States by sea to the mouth of the great Yukon River that empties into the southern part of Norton Sound. This voyage through the Pacific, Bering Sea, and the southern part of Norton Sound is available as a means of transportation for traffic into the interior of Alaska from May to November. From St. Michael, at the mouth of the Yukon, will be found river steamers of about the same general character as those used in the earlier history of the navigation of the Mississippi and Missouri by the overland emigrant to Oregon. This means of transportation is available from the middle of June, when the ice passes out of the Yukon River, until the middle of September, when its northern tributaries begin to congeal and the flow of ice precludes further navigation.

The second route available to-day is that through the Gulf of Alaska and Cook Inlet to the

mouth of the Midnooski River, from which point an overland route is available to the lower Tanana Valley. This route is available from the latter part of April to the middle of November. The head waters of Cook Inlet are of a character that renders navigation for ocean-going steamers extremely difficult.

THE ALL-AMERICAN ROUTE.

The third, and by far the most desirable route, is that through the Gulf of Alaska and Prince William Sound into the waters of Port Valdez, a landlocked harbor with anchorage sufficient to accommodate the navies of the world. The temperature and depth of its waters are said to be such as to render it available as a harbor for ocean-going steamers during every day in the year. Through the Keystone Pass, in the Coast Range of mountains, and through the valley of the Copper River, crossing the main range of the Rocky Mountains at Mentasta Pass; thence crossing the head waters of the Tanana River to the Forty Mile country, to the head waters of American Creek, and down this stream to Eagle City on the banks of the Yukon. The entire breadth of central Alaska is traversed over this line on an all-American route, which is the shortest through American territory by 250 miles, and extends through a section of country that may in a few years be self-sustaining. Over this route citizens of the United States may travel at will without taxation or the petty annoyances necessarily incident to travel through a foreign nation. This route appears to have hydrographically and geographically a preponderance of advantages that entitle it to favorable consideration as the all-American route from the seaboard to the upper Yukon River in Alaska.

The work of the season of 1899, which has been pushed to a practical issue by the War Department, has resulted in the organization and prosecution of many industrial pursuits. Mining companies have sent their principals into the field to develop the resources of the Copper River Valley, which had hitherto been locked up in the mountain fastnesses, owing to the inaccessibility of that region. Railroad companies have been organized, and their field staff of engineers sent forward to complete the preliminary work for the laying of the track and the building of wharves and bridges. The small farmer has built his log cabin along this all-American route, where his wife and children will till the soil and minister to the wants of the travelers. Contracts have been entered into for the delivery of domestic animals to the various camps in the Yukon Valley over the all-American route, and as a result that part of our domain, which would undoubtedly have remained dormant for years to come, has, by the helping hand extended to the frontiersmen by the military, developed those industries that in the near future may become great commercial interests.

CAPE NOME.

The discovery of gold in placer deposits in paying quantities on the shores of Norton Sound in Bering Sea in 1898 revived interest in Alaska and greatly increased the work of the army. Responsive to the demands of the situation, the following order was promulgated on the 19th day of January, 1900, viz:

GENERAL ORDERS, No. 8.

HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE, *Washington, January 19, 1900.*

The following order has been received from the War Department:

WAR DEPARTMENT, *Washington, January 19, 1900.*

By direction of the President, all that portion of the Department of the Columbia embracing the territorial limits of Alaska is created a military department, to be known as the Department of Alaska. Col. George M. Randall, Eighth United States Infantry, is assigned to the command of the department, with headquarters at Fort St. Michael.

Pending the opening of navigation Colonel Randall, with such officers as may be detailed to report to him for duty in the Department of Alaska, will take station at Seattle, Wash.

All explorations and surveys within the limits of the Department of Alaska will hereafter be under the special charge and direction of the commanding officer thereof, in connection with the engineering work pertaining to that department.

All officers now engaged upon exploring or surveying duty, or who may hereafter be ordered upon such duty, within said limits will report to the department commander, and they will submit to him all reports, maps, and correspondence relating to their operations.

The department commander will forward all such reports, maps, etc., to the Adjutant-General of the Army, with his remarks and recommendations thereon, for the action of the War Department, in order that the continuing work pertaining to such explorations and surveys may be done with reference to and in conformity with that previously done and of record in this office.

ELIHU ROOT, *Secretary of War.*

By command of Major-General Miles:

H. C. CORBIN, *Adjutant-General.*

Henceforth the Department of Alaska is destined to be one of the most interesting of all the departments under the authority of the Secretary of War.

RECONNOISSANCE OF THE YUKON RIVER.

BY

CHARLES P. RAYMOND.

1869.

RECONNOISSANCE OF THE YUKON RIVER.

By CHARLES P. RAYMOND.

INTRODUCTION.

The first reconnoissance in Alaska was made by Charles P. Raymond, captain of engineers, in 1869. His instructions were to visit Alaska and determine the longitude and latitude of Fort Yukon. He was also directed, so far as practicable, to ascertain and report on the amount of trade carried on by the Hudson Bay Company within the Alaska Territory. He was to report more particularly upon the quantity of goods brought by them from British territory, and obtain all the information he could in reference to the resources of the Yukon and its tributaries, and with regard to the number and disposition of the native tribes on or in its vicinity. In addition he was instructed to make a report upon the number and condition of the public buildings at Michaelobski.

When the transfer of the territory of Alaska to the United States was consummated, few Americans were aware that we had acquired a river which, rising far in the interior and draining a vast area, flows 2,000 miles in its course to the sea. The Yukon is the largest and longest stream emptying on the western coast of the American continent, and it may well be regarded as one of the great rivers of the world.

This mighty stream, the region which it waters, and the tribes which inhabit its banks will be the subjects of subsequent chapters. In these introductory pages it is proposed to give, as briefly as may be, a history of the explorations which have been made in this portion of the new Territory; to indicate the sources of information which exist concerning it; to explain the character and scope of the duty with which Captain Raymond was honored; and, finally, to describe the system which has been followed in the preparation of this report. The coast of Russian America and the islands of the Aleutian Archipelago have been well examined by both Russian and English navigators. The interior of Alaska was at this time comparatively unknown. In the year 1842 Lieutenant Zagoskin, of the Russian navy, visited, under the direction of the Russian Government, the region of the Kvichpak (Yukon) River and made extensive explorations, remaining in the country about two years. He afterwards published a book, which has been translated into German, containing the results of his observations. He traveled, it is believed, from the mouth of the river to a point a little above Nulato, the most eastern post of the Russian company, a distance from the sea of about 600 miles. His book was almost the only authority concerning the river until, in the year 1855, the Western Union Telegraph Company commenced explorations for an overland telegraph route, in order, by a cable crossing Bering Strait, to connect the eastern and western hemispheres. This enterprising company employed several hundred explorers on both sides of the Pacific; and their explorations in the northern section of Russian America have added greatly to our knowledge of this part of the continent. It is said that the honor of having made the first journey from the western coast to Fort Yukon belongs to Ivan Simonsen Lukeen, an employee of the Russian company at St. Michael, who succeeded in reaching the fort in the summer of 1863; but the information thus obtained was not made public. This journey was next made, in the summer of 1866, by Messrs. Ketchum and Labarge, of the telegraph company. Up to this time the Yukon River of the

English and the Kvichpak River of the Russians had been supposed to be distinct streams; and they are represented on quite recent maps, the former emptying into the Arctic Ocean and the latter into Norton Sound. From this exploration we first learn that they are one and the same stream.

In the winter of 1866–67 these adventurous travelers again made their way, this time on the ice, to Fort Yukon, and in the following summer pushed on to Fort Selkirk, more than 400 miles farther up the river, and the highest point yet reached by explorers from the coast. These gentlemen have published no account of their adventures.

The next expedition up the river to Fort Yukon was made by Messrs. William H. Dall and Frederick Whymper, the former director of the scientific corps of the telegraph company, the latter likewise an officer of the company and an artist. In the autumn of 1866 these gentlemen crossed the portage from Unalachleet to Nulato, where they wintered, and started early in the spring of 1867 to Fort Yukon. Making their way with considerable difficulty in "bidarras," or skin boats, they finally reached their destination in the latter part of June, after traveling almost constantly, day and night, for twenty-nine days. They remained at Fort Yukon for about two weeks, and then reembarking in their light boats started down the river. Traveling night and day, and aided by the rapid current, they arrived at St. Michael Island after a journey of fifteen days and a half, which Mr. Whymper terms as a mere holiday excursion. To this exploration we are indebted for a large amount of reliable information concerning the Yukon. In 1869 Mr. Whymper published his travels in Alaska and on the Yukon, which gives a pleasant account, accompanied with excellent illustrations of this and other explorations, and conveys a clear and truthful idea of the regions which it describes. After this journey Mr. Dall remained for more than a year on the lower part of the river. He was able to collect from the Russians and English a vast amount of information, and he seemed to have combined with these advantages great energy and a special fitness for the work. In 1870 he published a large volume, entitled Alaska and its Resources, which is filled with information concerning the Territory, gathered not only from his own experiences, but from every other available source. The upper portion of the river, between Fort Yukon and Fort Selkirk, has been known for many years to the traders of the Hudson Bay Company. Above the latter point the river was partially explored in 1867 by Michael Byrnes, an employee of the telegraph company. The remaining portion is only known from the reports of Indians. Fort Yukon, situated at the most northerly point of the Yukon River, had been for the past twenty years the extreme western trading station of the Hudson Bay Company. It was supposed to be west of the boundary between Russian and British America, but it had never been definitely ascertained, and its establishment was therefore contrary to the terms of a treaty existing between the Russian and English Governments. The traders of the Russian company, had, however, with one exception, never ascended the river beyond a point several hundred miles below the post, and seem to have had no disposition to object to this invasion of rights which they did not desire to enjoy. Nevertheless, this post was the occasion of great loss to the Russian company; for upon the opening of the Yukon in the spring, the enterprising and energetic Scotchmen of the station were accustomed to descend the river for some 300 miles to a station called Nuclucayette, where they met the assembled Indian tribes and purchased their stores of winter skins before the tardy Russians, delayed by current and ice, could arrive at the trading ground. The retirement of the Russian-American Company, consequent upon the transfer of the territory to the United States, inaugurated a new order of things. Immediately several American companies located small establishments upon the river and near the coast, and one company sent up the river a small party, which succeeded after great efforts in reaching a point near Nuclucayette, and wintered opposite the mouth of the great Tanana. In the following spring, when the traders of the Hudson Bay Company paid their annual visit to Nuclucayette, their right to trade in the "Indian country" of the United States was fiercely contested, and they were informed by the Americans that any future attempt to purchase skins within our territory would be resisted, if necessary, by force. In the spring of 1869 a new venture was projected by capitalists in San Francisco. It was proposed to transport a small steamer upon the deck of a sailing vessel to some point near the mouth of the river,

and, launching it, to ascend, if possible, as far as Fort Yukon, trading along the banks. In connection with this enterprise it was regarded as extremely desirable that the question of English right to trade in this portion of our territory should be definitely settled; and as the region in the vicinity of Fort Yukon was supposed to be peculiarly rich in furs, it was also desired that the position of this post should be officially determined, and, if it was found to be within the territory of the United States, that measures should be taken to cause its abandonment by the English company.

NARRATIVE.

On the 6th day of April, 1869, accompanied by Mr. John J. Major, my assistant, I sailed from the harbor of San Francisco on the brig *Commodore* bound for the port of Sitka. This vessel was to transport the employees and supplies for a new trading company to St. Michael Island, in Norton Sound, and she carried upon her deck a small stern-wheel steamer, about 50 feet in length, entitled the *Yukon*, which was to attempt the ascent of the great Kvichpak or Yukon River.

We arrived at Sitka on the 24th day of April after an uneventful voyage of eighteen days. We remained there two weeks, and during this time, although the weather was generally unfavorable, we succeeded in obtaining a few observations to determine the errors of the chronometers.

At this point Private Michael Foley, Ninth United States Infantry, joined my party, being ordered to report to me for duty by Brevet Major-General Davis, commanding the department. He accompanied me during the remainder of the expedition.

On the 9th day of May we sailed from the harbor of Sitka, and after a stormy voyage of twelve days we arrived at Unalaska Harbor, in the Aleutian Islands. The circumstances of the expedition detained us here for about two weeks, and during this time the chronometer error was determined on several occasions.

We sailed from the harbor of Unalaska on the 8th day of June, expecting to arrive at St. Michael Island in about a week. The weather was, however, generally unfavorable, and on the 13th we encountered extensive fields of ice which had been detached and driven off from the northern coast. To escape this danger, we were compelled to turn back several times, and finally to make considerable easting in order to pass between the ice fields and the coast. Much delayed by these obstacles, and also by a severe northwestern gale which lasted for several days, we arrived finally at St. Michael Island on the 29th day of June, after a voyage of twenty-four days.

I shall describe this island later on. It is sufficient to say that, although the anchorage is entirely open, the island covers it from the prevailing winds, and it is the nearest position to the mouth of the Yukon at which a vessel can lie with safety.

We remained at St. Michael Island four days, making the necessary preparations for our journey up the river. On the 1st of July the little steamer *Yukon* was successfully launched, and a short trial trip gave excellent results. Sextant observations for the determination of time were made at this station. I left here a set of meteorological instruments, with which Captain Riedell, the chief trader of the station, kindly volunteered to observe.

Having obtained two large open boats, which we loaded with supplies and trading goods, and having constructed a small rough pilot house upon the steamer's deck, we were prepared for departure. Early on the morning of the 4th of July, taking our boats in tow, with flags flying and guns firing, we started on our voyage to the upper mouth of the great river. Our party was composed as follows: Captain Benjamin Hall, master; John R. Forbes, engineer; Frederick M. Smith, superintendent; Ferdinand Westdahl, chief trader; Michael Labarge, chief trader; John Godfrey, trader; Robert Bird, trader; Lewis B. Parrott, passenger; Captain Charles P. Raymond, John J. Major, Michael Foley, and two laborers. Our course lay through the narrow channel which separates the island from the mainland and along the coast for about 70 miles. We accomplished this portion of our journey without much difficulty, although our little vessel was hardly fitted for this sort of navigation, and early on the morning of July 5 we entered the upper mouth of the Yukon River.

A native, well acquainted with the lower portion of the river, had been engaged at St. Michael, and under his guidance we groped our way among the islands and shoals, occasionally grounding or turning back to seek a more favorable channel. As there was a bright twilight during the short time that the sun was below the horizon, we traveled night and day, only stopping occasionally to obtain wood or to purchase a few skins or a little game at some native village. Our approach was usually the occasion of considerable excitement. As we drew near a village, we were accustomed to herald our coming by a vigorous sounding of the whistle, and this was usually followed by a general stampede of men, women, children, and dogs. Our little steamer, which, puffing about the bay of San Francisco, had seemed a mere toy, appeared to them a huge monster, breathing fire and smoke. Curiosity would, however, bring the more daring ones to the river's bank, and, having won their confidence by a few judicious presents, we would soon find our boat surrounded by a score or two of noisy and excited natives. These people, and the natives of the country generally, will form the subject of a subsequent chapter.

Throughout the trip I alternated with Mr. Major in taking notes and bearings from which to construct a map of the river, and we employed every opportunity to make observations on shore. We found this duty somewhat severe, as it had to be continued throughout both day and night; and our accommodations were so limited that it was often impossible to obtain a place in which to sleep when not at work. We persevered, however, and the map which I have the pleasure to submit with this report is the result.

The swarms of mosquitoes and gnats which abound on the river during the months of June and July proved a very serious annoyance. When the boat was not in motion, we were obliged to wear face nets and gloves; and on one occasion an attempt to make sextant observations failed completely from this cause. The mosquitoes are much larger than those met with in lower latitudes. The gnats or sand flies are very troublesome, and so small that a net is no protection from them.

Two or three times a day the steamer stopped to obtain wood. This was usually cut from drift timber, which is piled in large heaps at short intervals along the river, where it collects in the spring. Occasionally in the latter part of the journey we were obliged to cut standing timber.

On the 12th of July we arrived at Anvic, a small native village situated at the mouth of the Anvic River. Here we stopped two days, and established a trading station, leaving Bird temporarily in charge of it. At this place we obtained a variety of observations.

We left Anvic on the 14th. About 20 miles above, the river narrows and the current runs with great velocity. Doubts had been expressed as to the possibility of our passing this point. By skillful management, however, this obstacle was overcome without serious difficulty. At the request of the entire party, I gave this place the name of "Hall's Rapids," in honor of Capt. Benjamin Hall, who first passed this point with a steamer. This is the only name that was bestowed by my expedition on any place in the Territory. We arrived at Nulato on the 19th. This was once the easternmost station of the Russian company, but at the time of our visit it had been abandoned. We stopped here two days. A trading station was established and a few observations were obtained. Leaving Nulato on the 19th, we arrived at Fort Adams on the 22d. This station is near the mouth of the Tanana River, the most important tributary of the Yukon, and was at this time the easternmost station ever established on the river from the western coast. Shortly before our arrival at this place we met two traders, Robert and Moses, Canadian Frenchmen, and friends of Labarge, who were slowly making their way down the river in a rudely constructed boat. They were immediately engaged by the superintendent of the company, and Labarge started on a canoe journey down the river for a temporary visit to St. Michael. Our party remained at Fort Adams two days, landing supplies and making necessary repairs, and here a variety of observations were obtained. We left Fort Adams on the 24th. About 17 miles above the station we passed Nuclucayette and the mouth of the Tanana River, the waters of which increase the current of the Yukon for a considerable distance. From this point the river gradually narrows and its banks increase in height. We learned from these indications that we were gradually approaching the Rampart Mountains, and the rapids, of whose dangers we

had heard so much from the natives below. About noon on the 25th we arrived at the entrance of these rapids, and, after taking on a good supply of wood, we passed through them without great difficulty, although the channel is narrow and the current runs with great rapidity. After passing this point we met with no further obstacles, although the shallowness of the upper portion of the river and the great velocity of the current in many places rendered our voyaging extremely slow. On the 31st of July, at 4 p. m., we arrived at Fort Yukon, thus successfully terminating the first journey by steam ever made on the Yukon River. The time of actual travel, including stoppages for wood, was 23 days, and the distance passed over about 1,040 statute miles.

At Fort Yukon, notwithstanding the somewhat unpleasant character of our errand, we were cordially welcomed by Mr. John Wilson, the agent of the Hudson Bay Company at the station, and by the Rev. Mr. Bumpus, a missionary of the Church of England lately arrived from Fort Simpson, on the Mackenzie River. Mr. Major and I were speedily established in one of the comfortable log buildings which compose the fort, while the remainder of the party were domiciled in the steamer or encamped on the shore near by.

As the river was rapidly falling, it was necessary that the steamer should start on her seaward journey as soon as possible. I was anxious to make an approximate determination of our geographical position without delay, in order that my companions might make their arrangements accordingly, and carry back the information to the coast. A week of unfavorable weather entirely prevented us from obtaining suitable observations; but on the 7th of August we obtained a good observation of the solar eclipse, from which we were able to compute an approximate longitude, sufficiently accurate to set at rest the question at issue, and inform our traders that they were in American territory.

It seems proper to say, in this connection, that by General Halleck's permission I had consented temporarily to represent the Treasury Department, and under the instructions of that Department, on the 9th of August, at 12 m., I notified the representative of the Hudson Bay Company that the station was in the territory of the United States; that the introduction of trading goods, or any trade by foreigners with the natives, was illegal, and must cease, and that the Hudson Bay Company must vacate the buildings as soon as practicable. I then took possession of the buildings and raised the flag of the United States over the fort.

Early on the morning of August 10 the steamer started on her return trip down the river, leaving Mr. Westdahl and Moses in charge of the trading station which had been established at the fort. I also remained, with Mr. Major and Private Foley, in order to obtain observations for more accurate determinations. The nights were so light as to greatly embarrass astronomical observations, and I desired, therefore, to remain as long as possible.

In the latter part of August the river commenced falling rapidly. This, we presumed, was occasioned by the freezing of the tributaries near their sources, and it was regarded as an indication that the season was near its close. We reluctantly decided that it would be unsafe to delay our departure longer, and made our arrangements to leave the fort early on the 27th.

I was anxious to employ the bark canoes of the country for our journey, as they were considered by far the best boats for that kind of travel, and this opinion was confirmed by my subsequent experience; but none could be obtained. The ingenuity of Moses had, however, devised and, with our assistance, constructed a small skiff of well-seasoned timber sawn from spruce drift logs. She was calked with rags, and finally coated thickly with pitch. Moses called her the *Eclipse*.

On the evening of the 26th she was completed, and we placed her in the water, fastening her with a strip of moose hide. On the next day we intended to dismantle our observatory and toward evening begin our journey. But in the morning we discovered that the hungry dogs of the station had eaten the moose-skin fastening, and our boat had started off on an independent voyage to the coast. A pursuit was immediately instituted, and toward evening the party returned, bringing with them the *Eclipse*, in a somewhat dilapidated condition. In excuse for the dogs, it should be added that they are fed but once a week during the summer.

This little accident was the occasion of some delay; but on the 28th of August, at 4 p. m.,

we finally left the fort. The party consisted of Mr. Major, Private Foley, and myself, and two natives, who had been brought up from Nulato, and were to accompany us as far as that place. We were obliged to leave our observatory tents and some of our instruments, to be sent down at the first convenient opportunity. We took with us, however, a small A tent, which had been used as a magnetic observatory. For provisions we had a ham, a small piece of bacon, and a little hardtack, and about 25 pounds of "moose pemmican," a very seasonable present from Mr. Wilson. This pemmican is an article of considerable importance among the traders of the Hudson Bay Company, and well deserves a description. Moose (or any other) meat is carefully and thoroughly dried in the sun, and then pounded to a powder. The sinews having been picked out, it is placed in a tight buckskin bag and boiling fat is poured on it. Marrow is preferred. The bag is then fastened and pressed with a heavy weight. In cooking it, a small portion is placed, with a little water, in a frying pan over a bright fire, and a little salt is added when it can be obtained. By absorbing water it increases to at least twice its former bulk and a handful will make a hearty meal for one man. When properly prepared, it has an agreeable taste. We found it admirably adapted to persons working hard and requiring strong food. In addition to the provisions mentioned we had a supply of tea, the universal drink of travelers of every description in this country.

Our journey down the river was too monotonous to require much description. We felt the necessity of traveling with rapidity, and unless the weather was unfavorable we were at the oars from sunrise until it became too dark to proceed with safety. We then landed and went into camp for the night. When the wind was favorable a small sail, which Mr. Westdahl had rigged for us, proved of material assistance. We were occasionally compelled to land to repair our boat, which it was almost impossible to keep reasonably tight, and we were much delayed by this cause. Passing through the Ramparts we saw a good many moose. Early on the morning of September 3 we entered the rapids. They were covered with a dense white fog, but this lifted before we came to the most dangerous part, and we were enabled to pass in safety. About 7 p. m., on the same day, we arrived at Fort Adams. We found Roberts alone in charge of the station. He informed us that the steamer had come down from Fort Yukon to this point in one day. Being of course obliged to run ahead of the current, she had descended with great rapidity, From this point the journey up the river had consumed seven days. We remained here until the evening of the next day, as our boat was sadly in need of repairs. Having obtained a supply of provisions we again started, and, after traveling four days and a half, arrived at Nulato about noon on the 8th. Here we expected to find American traders, and also to obtain a good boat, but no boat could be procured and the traders had gone to St. Michael, leaving the station in charge of a native. Our Indians could not be persuaded to accompany us farther, nor could others be obtained. After a delay of an hour or two we started again, somewhat disconsolately, in our battered and leaky boat, with our force seriously weakened and the most laborious part of our journey still before us. On the 12th, at about 4 p. m., a sudden turn brought us to Halls Rapids. A strong breeze blowing against the current made this portion of the river very rough. Suddenly, and almost without notice, our boat was swept into the rapids and it was only by great exertions that we were able to reach the shore in safety. This last trial was almost too much for the *Eclipse*. She was now very nearly a wreck. Nevertheless, not being in a condition to choose, we reembarked early the next morning, one man baling and the two others at the oars, and swiftly passing the rapids worked our way slowly down the river. At 4 p. m. we pulled the *Eclipse*, now thoroughly useless, upon the shore near Anvic. At Anvic we found Mr. John Clark in charge of the station, and also our old friends, John Godfrey and Robert Bird, the trappers. We endeavored to obtain here one of the large native seal-skin boats, called "badarras," and some Indians; but the season was so far advanced that the natives were afraid to attempt the journey down the river and along the coast, a state of affairs which gave us not a little anxiety. On questioning the old chief of the village, however, I ascertained that the Indians are accustomed occasionally, in the summer, to ascend the Anvic River (which, at some distance from the Yukon, makes a great bend toward the coast), to a point near its head waters, and cross by a tolerable portage to the native village of Ikikiktoik, situated on Norton Sound, about 18 miles north of

St. Michael Island. But it was feared that an ascent of the river would prove impracticable so late in the season; and Mr. Clark, being a new-comer to this part of the country, was unable to advise me, although he promptly volunteered to accompany me if I should decide to make the attempt. This being apparently the only avenue of escape, I did not hesitate long. Mr. Clark went energetically to work, and in a few hours had procured six birch-bark canoes and a sufficient number of Indians.

At 4 p. m. on the 14th we left Anvic. Our journey up the river was extremely slow. We were obliged to pole the canoes all the way, on account of the shallowness of the water and the great rapidity of the current. We were somewhat delayed by frequent injuries to our boats; but the birch-bark canoe is easily and quickly repaired. Our Indians, not fancying hard work, were often quite anxious to leave our service, in most cases taking an informal departure during the night; but we managed to keep our force pretty well recruited by a system of mild conscription on the native villages along the river.

On the evening of the 14th we made an unpleasant discovery. The larger portion of our provisions, which we supposed safely packed in one of the canoes, had been left behind. An Indian was immediately sent back to Anvic, with a note from Mr. Clark, directing Bird to send us supplies for five days. Our messenger overtook us on the evening of the next day. He brought a note from Bird, saying that he could not make out Mr. Clark's "handwrite," but he presumed we wanted something to eat. The provisions accompanying this epistle consisted of about sufficient hard-tack for a single meal, which we proceeded to eat upon the spot, making up our minds to live upon the country thereafter. Fortunately we had plenty of tea.

On the evening of the 18th we arrived at a large village. We were received with great kindness by the chief, and comfortably installed in the best house, which he vacated for our accommodation. He informed us that, on account of the shallowness of the river, it would be impossible for us to reach the entrance of the portage by water. We were determined, however, to go on as far as possible. We made a hearty meal on fish, seasoned with gunpowder, and spent a very comfortable night at the village.

On the next morning, having exchanged our canoes for a large skin "badarra," drawing somewhat less water, we resumed our journey. The chief accompanied us at his own desire. Previously we had had considerable rain, but on this day the weather was delightful. We worked our way along very slowly until night, the water becoming more and more shallow. At dark we went into camp, and an examination of the river from the shore proved further progress by boats impossible.

We were now about 50 miles from the river's mouth, and probably about 20 miles from the portage, and we had to choose between two courses. We could easily return to Anvic and winter at that place, or we could attempt to cross the country in a direct line to Iskikiktoik on the coast. The first course seemed out of the question, since the station was provisioned for only three men. On the other hand, a portage across an unexplored country of an extremely difficult character, known to be intersected with mountain ranges, necessitated a dependence principally upon the rivers for our supply of food. As this might be cut off in a moment by a sudden change of weather, it appeared equally impracticable. After much anxious discussion, it was finally determined to keep on, and not to turn back unless it should become absolutely necessary. During the night there was a violent rainstorm. In the morning we packed everything which it was necessary to carry on the backs of the Indians. We abandoned our tent and such other articles as were not absolutely required, and, under the guidance of the chief, began our journey. Our course lay first over a gentle ascent covered with pines and thick underbrush, which much impeded our progress. After an hour's travel we descended into a mossy swamp, through which we traveled until night. At dark we went into camp, wet and very tired. Of our provisions there only remained a small piece of ham, which we had carefully laid aside while on the river, to be used when fish could not be obtained. This we divided, the ration consisting of a thin piece about the size of a half-dollar. Fortunately we were able to recruit exhausted nature with unlimited tea, although we had been for several days without sugar.

It may appear strange that we did not bring fish with us from the river, but they could not

have been obtained without delay. We had underestimated the distance to the second crossing of the Anvic River, where we supposed we could obtain an abundant supply. On the next morning we made an early start without breakfast. Ascending the first range of hills we passed over a divide, and early in the afternoon we began to descend into the valley beyond. As the valley first came in view, a welcome sight greeted our eyes. It was the smoke of a camp fire, and, as we drew nearer, we saw a little hut covered with hides, and near by rude frames from which were suspended great sides of reindeer meat. During our day's journey we had seen many herds of reindeer feeding on the hills, but we could not spare time to hunt them. On approaching the hut we found that it was the habitation of one of the natives of the coast. Earlier in the season he had penetrated to this valley to hunt, but, having been seized with a severe attack of rheumatism, he had been compelled to remain later than usual, until his friends should come for him. His wife was with him. Upon inquiry we found that he was a brother of "New Year's," and, I believe, nearly related to "Hungry" and "Lunchy," all Indians celebrated in the annals of the telegraph company's explorations. He begged so earnestly for "American medicine" that we had not the heart to refuse him, although we had nothing of that character except a Seidlitz powder. We gave him the contents of the blue paper, and, to our astonishment, he soon declared that he felt much better. At this camp we feasted to our heart's content. "New Year's" brother most generously told us to take all the meat we wished, refusing any compensation. We decided to remain here during the day, and prepare provisions for the rest of the journey. The meat not having been dried we could not make pemmican, but we prepared a substitute for it in the following way: The meat was thoroughly boiled, and then cut into very small pieces. These were placed in a bag and boiling grease poured over them. The whole was then pressed tightly into the smallest possible space. This would have proved a very good substitute had not a good deal of the meat which we were obliged to use been tainted, which made it all offensive.

Mr. Major made, from a description given by "New Year's" brother, a little topographical sketch of the country, which was very useful to us, and proved wonderfully correct.

On the morning of September 22 we again broke camp and began the ascent of the range of hills on the west side of the valley. From this point the timber entirely disappears, except a little low brush near the water courses. The nights had now become cold, and, in order to find a camp where brushwood could be obtained, it was necessary to reach the second crossing of the Anvic River. We passed over two ranges of high hills, alternately plunging through a thick, wet moss, and stumbling over rough stones. At 8 p. m. we finally arrived at the Anvic River, almost dead with fatigue. On the last range of hills Foley's strength completely failed him. Early in the march his shoes had become unserviceable, and he was obliged to substitute for them mooseskin moccasins; consequently, his feet had been severely bruised. He made a great effort to keep on, but, being taken with vomiting, he declared that he could go no farther. We made him a bed on the hillside, and then went on down to the river, where the light of a distant campfire assured us that assistance and food could be obtained. On our arrival at the river we found a temporary fishing camp, occupied by Coast Indians. A party was immediately sent back with food and fuel to Foley, and he arrived safely at the camp about noon on the next day. At this camp we found plenty of provisions. We obtained here a few reindeer tongues, which are justly considered a great delicacy. We remained at this camp until about 1 p. m. Having profited a good deal by this rest, we started with renewed spirits on our journey. We ascended the hills on the west of the Anvic Valley, and when we reached the summit we saw with delight the broad expanse of Norton Sound in the distance. We then descended into the valley of the Golsova Richka, and at sunset we arrived at the little river. Wading it, we went into camp on its western bank. On the next morning we made an early start, as there is no fuel and no place suitable for a camp between the Golsova and the coast, and it was therefore necessary to conclude our journey in one day. We first passed over a low range of hills bordering the river. Our journey then lay over an almost level country, with the exception of a high hill near the coast, which we crossed to avoid swamps.

Travel in this part of the country is extremely difficult. The ground is covered with hummocks and deep moss, and it is nearly all a swamp. Through this terrible region we floundered

until 8 o'clock in the evening, when our troubles were terminated by our safe arrival at Ikikiktoik. This was perhaps our most fatiguing day's journey. We traveled about 20 miles through a country which, under any circumstances except those of actual necessity, might well be called impassable.

At Ikikiktoik we expected to find plenty of natives and boats, and we intended to conclude our journey to St. Michael Island on the same night. Unfortunately, however, we found the village temporarily deserted. But one native remained—a sick man. We found only one small boat, capable of carrying one person. We were therefore compelled to spend the night there. We had eaten the last of our provisions, supposing our journey to be practically ended; but, fortunately, one of the Indians had killed a rabbit as we were entering the village. With this and some sea-water we made a soup, which we fancied delicious, as we had not tasted salt for more than a week. Early the next morning I dispatched a messenger to St. Michael Island with a request for assistance, and about nightfall the superintendent of the company, Captain Ennis, arrived with a whaleboat and a bountiful supply of provisions, and transported us to the ship. Thus ended our eventful and, in many respects, unpleasant journey.

On the 27th of September the *Commodore* sailed for San Francisco. On the 3d of October we arrived at the island of St. George, and here we obtained the first news which we had received from the civilized world for about six months. On the 6th of October we arrived at Unalaska Island, where we were delayed several days. A voyage of twenty-seven days from this place, during which we experienced a succession of severe gales in Bering Sea and, indeed, unfavorable weather all the way, brought us at length to San Francisco, where we arrived on November 6, exactly seven months from the time of our departure.

DESCRIPTION OF THE RIVER AND ADJACENT COUNTRY.

The great Yukon River, the largest stream emptying on the western coast of America, is supposed to take its rise approximately in latitude 58° 31′ north, and longitude 131° 50′ west. At its headwaters it is known as the Tahco River, and it is said to have been visited many years ago by the traders and trappers of the Hudson Bay territory. The northernmost point of the river is at Fort Yukon, where it makes a sudden and decided bend toward the southwest. The little that we know concerning this portion of the Yukon is derived from the accounts of Ketcham and Labarge and Michael Byrnes (vide Introduction, pp. 7 and 8) and various reports of Indians, which establish the identity of the Tahco River and the Yukon. The general direction of the river from its headwaters to Fort Yukon is supposed to be about northwest. The length of this portion of the river must be at least 1,000 miles. From Lake Labarge (about latitude 61° 45′ north and longitude 135° 30′ west) to Fort Yukon it is called the Lewis River. Just below the lake a tributary enters from the south. From its headwaters the Indian tribes inhabiting the vicinity are accustomed to make a portage to the headwaters of the Chilcat, proceeding via the latter river to Sitka for purposes of trade. Probably the largest tributary of the Yukon above Fort Yukon is the Pelly, which enters the main river from the east, approximately in latitude 63° north and longitude 136° 40′ west. At its mouth the Hudson Bay Company formerly had a trading station, called Fort Selkirk, which was destroyed by Indians in the year 1851, and since that time has remained unoccupied. This portion of the river is described as flowing, with an extremely rapid current, through a mountainous country. Fort Yukon, situated in latitude 66° 33′ 47″ north and longitude 145° 17′ 47″ west, is the highest point which my expedition reached. Here the Yukon receives the waters of the Rat, or Porcupine, a large tributary, emptying on the right bank, and flowing from its headwaters in a general direction a little south of west. From Fort Yukon to the mouth of the Chetaut River, a distance of about 200 miles, measured along the deepest channel, the river has a general direction about west-southwest. The windings of the stream, however, within this distance are innumerable, the air-line distance between these points being only about 150 miles. The country on both sides of the river is low and level, usually consisting of sand or gravel. The average width of the river is about three-fourths of a mile, but in some places, measuring across its numerous islands, it widens out to 5 or 6 miles. The current through all its passages is extremely rapid, and in

many places the best channel is not more than 3 feet in depth. The vegetation on the banks and islands is principally a chaparral of willow and poplar, with occasional groves of spruce and birch. The principal tributaries emptying into this portion of the river are the Achenchik, Notochargut or Dall, Chetletchuk, and Chetaut rivers, all of which flow from the north. None of these rivers seems to be of much importance, with the exception of the Chetaut, which has been ascended for a few miles and found to abound in fish and game. There are no native villages on this portion of the river.

From the mouth of the Chetaut the Yukon rapidly changes in character. It gradually narrows into one channel; the islands disappear; the banks rise into hills; the stream becomes deep and rapid, until finally it plunges with great velocity through the Rampart Range. The bluff hills composing this range rise close to the water's edge. They are composed principally of a hard, greenish rock. Slate is occasionally seen, and at the rapids true granite appears in a ledge running across the river. Most of the hills are covered with groves of spruce intermingled with birch, but the trees are all small, and in many places they lie for some distance scattered in every direction, showing the small depth to which their roots attain in the frozen ground and the great force of the winter winds.

From the Chetaut River to the Rampart Rapids, a distance of some 60 miles, the general direction is about southwest. The river averages about two-thirds of a mile in width, but at the rapids the width does not exceed 150 yards. The tributaries emptying into this portion of the river are, from the north, the Atonisonik, and, from the south, the Yukuchargut or Whymper River. Neither is important.

The first native village met with in descending the river is situated on the right bank, just below the Rampart Rapids. It is occupied by Senati, an old Kutchin chief, and his people, whose permanent home is probably in the vicinity of Fort Yukon, but who have established themselves in this place for the purpose of fishing. It is indicated on my map as Senati's village.

From the Ramparts to Nulato, a distance of some 240 miles, the river has a general direction about west by south. There are, however, many bends, although these are less sudden and numerous than in the other portions of the river.

After leaving the Rampart Gorge the stream widens and the current dimishes in rapidity. The right bank is for the most part hilly, and on the left, although this shore is generally low and flat, hills and bluffs occasionally rise close to the water's edge. The channel, as a general rule, runs close to the right bank, a remark which holds good for all that portion of the river below the Ramparts. The average width is about three-fourths of a mile. Now and then islands are encountered, but for the most part the stream is open and the channel plain.

This portion of the river, in my opinion, far surpasses all other parts in natural beauty. About 50 miles below Fort Adams the Supuonila range of mountains commences on the right bank. It is a succession of elegant, well defined peaks and ridges, describing a beautiful curve for many miles, with its concavity toward the river and its flanks resting at the water's edge. The right bank of the river is well timbered with spruce, poplar, and birch.

The principal rocks of this part of the river are slate and sandstone. Some of the sandstone bluffs are very remarkable in appearance. Quartz is found, and occasionally granite. I examined a specimen of bituminous coal which we obtained on this part of the river. It is of good quality, but the seam is very limited in extent. The principal tributaries emptying into this part of the river are as follows: From the north, the Tosekargut, Newchuklikargut, Newikargut, Melozekargut, and the Kuyukuk; from the south, the Tanana, Atutsakulakushchargut, Yukokargut, and the Kukuyukuk. The termination "kargut" or "chargut" signifies, in the native dialect, a little stream. Some of these "little streams," nevertheless, are large and important rivers, populated by many Indian tribes, and navigable for a considerable distance. Chief among all these rivers in importance, size, and beauty—chief, indeed, among all the tributaries of the Yukon—stands the great Tanana, "the river of the mountains." It empties into the Yukon about 30 miles below the Ramparts, and its rapid waters increase the current of the main river for a long distance. Only a few miles from its mouth have been traveled by white men. It

apparently comes from the southeast, but it is believed that many miles above the explored portion it makes a great bend from the east, its source lying near the Upper Yukon. At the mouth of the Tanana is the trading ground called Nuclucayette, where the Indians inhabiting the banks of this tributary are accustomed to congregate in the spring. About 17 miles below, and on the right bank of the Yukon, at the mouth of the Tasekargut River, is the American trading station called Fort Adams. The principal trading villages between this point and Nulato are Chokoyik, Newikargut, and Sakadelontin. A mile above the old Russian fort at Nulato (now abandoned) there is an American trading station. From Nulato to Andreavsky, an abandoned Russian trading station, situated about 350 miles below the first-named place, the river has the following approximate directions: From Nulato to Anvic, south-southwest; from Anvic to the upper entrance of the Shagelook Slough, south-southeast; from the upper entrance of the Shagelook Slough to the Great Bend, southwest; from the Great Bend to Andreavsky, west by south. It is difficult to convey an idea of this portion of the river, its numerous windings, its thousand islands, its bars and shoals, ever changing and shifting, baffling the traveler in his search for the channel.

Generally speaking, the right bank is high, exhibiting many bluffs of sand and rock, formed by the ice torrents in the spring. In this connection I may mention a rapid change which is going on here and in many other parts of the river. The ice undermines the high bank sometimes to a distance of 20 or 30 feet. On the projecting tops of the banks there are usually many trees. These, loosened by the action of frost and water, are soon precipitated into the stream beneath; and thus the river goes on widening and shoaling, while immense quantities of driftwood are sent down to the sea. Sometimes the right bank rises into high hills; again it falls away to rolling ground, and occasionally to flats. The left bank is low and level. Here and there, however, small hills are seen standing back a mile or two from the water, and for nearly the whole distance a range of distant mountains parallel to this shore is visible. In these mountains lie the sources of the great river Kuskokvim. The sandstones and slates continue throughout this portion of the river, but on the lower part a dark volcanic rock makes its appearance. Between a point near Andreavsky and the sea no rocks were observed. The hills on the right bank are generally well covered with spruce and poplar, occasionally intermingled with a little birch. Owing to the coldness of the winter climate, these trees do not usually grow to a great size; the left bank and the islands are generally covered with chaparral of willow and alder. This portion of the river has few tributaries of sufficient size to require notice, although there are many small streams, entering usually from the north. The principal tributaries from the north are the Takaitski, the Anvic, and the Konnekova or Clear River. The Takaitski empties into the Yukon about 50 miles below Nulato. It abounds in fish, and it is said that many Indians dwell upon its banks. The Anvic enters the Yukon about 160 miles below Nulato. It is the only tributary of the great river which I have ascended for any considerable distance. It has its source in the mountain ranges which run parallel to the seacoast; runs from its headwaters in a northerly direction for about 12 miles, and then, making a long, regular bend to the east and south, flows generally in a southerly direction until it reaches the main river. Its banks are often high and steep. The hills of the right bank of the Yukon turn at Anvic and follow the left bank of this river up to the point where it makes its great bend away from the coast. Its very shallow waters run with great velocity. It is, in a word, throughout nearly its whole extent a torrent. This river is traveled somewhat in summer by Indians, who occasionally reach its headwaters and make from thence a portage to the coast.

The Konnekova River enters the Yukon about 180 miles below Anvic. At its mouth it is about 500 yards in width, and so shallow that a bark canoe can hardly ride upon its waters. It abounds in fish, and empties a clear silver stream into the muddy waters of the Yukon. Two rivers join this portion of the Yukon from the south, the Kaiyuh and the Shagelook.

The mouth of the Kaiyuh River is said to be situated about 40 miles below Nulato. It was not noted in our itinerary, and I have no information concerning it.

About 130 miles below Nulato the Yukon separates into two branches. The main stream pursues a southerly course, but the lesser branch, running at first a little south of east, makes finally a great bend to the south and west, and enters the main river again about 60 miles below

the point of separation. This lesser branch is entitled the Shagelook Slough, and on it, a few miles from its entrance, is situated the mouth of the Shagelook River. Of this river little is known. I have not even seen its mouth, but its valley is said to be the richest fur country on the Lower Yukon.

A little below Andreavsky the Yukon bends abruptly to the northward, and runs about north by west from this point to the sea. There are said to be three principal outlets—the Aphoon or upper, the Kvichpak or middle, and the Kousilvak or lower mouth. Of these I had an opportunity to examine but one—the Aphoon. A little below Andreavsky the hills of the right bank die away, and the country on both sides of the river becomes low and flat. Shoals and sand bars are found on every side. The river spreads out to a width of about 3 miles, and finally, at a point about 22 miles below Andreavsky, separates into its mouths. The Aphoon outlet is about 40 miles in length, and has an average width of perhaps one-third of a mile. Its banks are low and flat, and are covered with a chaparral of alder and willow. This outlet enters the sea approximately in north latitude 63° 10′ and west longitude 164°. Besides Nulato, the Russian-American Company formerly had trading stations at the mission (250 miles below Nulato), Andreavsky, and Coatlick (near the coast). With the exception of the mission, where there is an American trading station, these points are now abandoned. There is also an American trading station at Anvic. The principal native villages situated on the main river between Nulato and the sea, in the order named, are as follows: Upper Kahltog, Kahltog, Lower Kahltog, Hultulkakut, Tagutakaka, Muskoietaka, Anvic, Makagamute, Ingekasagmi, Nunaikagumute, Kuyikaniukpuk, Ikaklagmute, Kochkogamute, Yukagamute, Chukchukamute, Tlatekamute, and Ankachagamuk. On the Anvic River three villages were noted. One of them is called Anemuk. The names of the others were not ascertained.

From the upper mouth of the Yukon to Redoubt St. Michael the traveled way lies along the coast. It is a distance of about 55 miles to the southwest extremity of St. Michael Island. Going through a narrow passage between the islands and the mainland, about 15 miles in length, we finally arrive at the anchorage off "the redoubt." This passage is known as "the canal." Several streams empty into Norton Sound between the upper mouth of the Yukon and St. Michael Island. There were also several native villages on this part of the coast, which were temporarily unoccupied at the time of our visit. The coast is low and flat, but back a few miles from the sea are several parallel ranges of hills. An idea of the country back of the coast may, perhaps, be obtained from a brief description of the ground which we passed over in our portage from the Anvic River to the sea. For about 20 miles from the coast the country is flat, swampy, and filled with standing pools. Close to the coast, however, there are a few isolated hills of volcanic character. There is no timber. A little brush grows around the pools, and the remainder of the country is covered with coarse moss. Back of this first belt of land is the first hill range, about 1,000 feet in height. On the other side of this is the valley of the Golsova Richka, a beautiful little river which runs northward, parallel with the coast, and empties into Norton Sound. This valley is full of swamps and chaparral. Crossing two more ranges of higher hills, we descend again into a narrow valley and arrive at the head waters of the Anvic River. This valley exhibits the same characteristics as that of the Golsova Richka. Beyond it rises another range of high hills, and beyond this again is another swampy valley, watered by a tributary of the Anvic. Thus far the hills are steep, barren, treeless, and in some cases swampy to their very tops. Beyond this, however, timber begins to appear. The eastern side of the next range of hills is thickly covered with spruce, poplar, and close underbrush. Passing these hills, and through a valley about 8 miles in width, we cross a narrow belt of rising ground, and finally descend again to the banks of the Anvic.

St. Michael Island is situated in latitude 63° 28′ north and longitude 161° 52′ 28″ west, and is separated only by a narrow channel from the mainland. It is about 17 miles long and 13 miles wide. At the northeast extremity there is a point of land on which are situated the buildings composing "the redoubt," described elsewhere in this report. This was the depot station established in 1833 by the Russian-American Company for this portion of the territory. Back of the redoubt for a mile or two the island is low, level, and swampy. Beyond the low ground are two

low hills. There are no trees on the island. Wood for fuel is obtained from the drift timber brought down by the Yukon in the spring. Directly west of St. Michael, and at no great distance, is Stuarts Island, which is of about the same size and has the same general characteristics as the former.

I have now concluded the account of that portion of the Yukon River territory which I have personally visited. There are, however, some adjacent portions of the country which are well known from the frequent journeys which have been made across them, and a few remarks on these portages will not be inappropriate.

About 40 miles northeast of St. Michael Island the Unalachleet River empties into Norton Sound. Its general direction from its head waters, which are some 50 miles from the coast, is about southwest. At its mouth was formerly situated an important trading station of the Russian company, now abandoned. This river is navigable for small boats for a considerable distance. The Russians, and in later years the explorers of the Western Union Telegraph Company, were accustomed to travel to Nulato by ascending the river, either by boats or on the ice, according to the season of the year, as far as the native village of Ulukuk, whence they made a portage to the Yukon, concluding the journey on that river.

The winter portage from Ulukuk has, for about 14 miles, a general direction about east-southeast to the Vesolia Sopka ("Cheerful Mountain"), which forms the termination of the Ulukuk Hills. The route to this point lies principally across an almost level country, with hillocks here and there, and occasional clumps of low willows. It is intersected by small streams emptying into a branch of the Unalachleet River. From the Vesolia Sopka the portage has a general direction of about northeast, and it terminates on the right bank of the Yukon, a few miles below Kahltog. The distance is about 50 miles. This portion of the route traverses sparsely wooded hills, and beyond these a low country, bordering a marsh called Beaver Lake; then over the flanks of some high hills, beyond which lies the Yukon. This brief description is drawn from Mr. Dall's account of his explorations.

The summer portage from Ulukuk is along the valley of a branch of the Unalachleet River, in a southeasterly direction, and reaches the Yukon at Yakutskalitnik, a point about 80 miles below Nulato.

I have spoken before of the portage from the head waters of the Anvic River to the coast. A portage from the head waters of the Golsova Richka to the mouth of the Anvic River, indicated on the map of Lieutenant Zagoskin, of the Russian navy, seems to me extremely doubtful.

The Russians formerly had a station called Redoubt Kolmakoff, on the Kuskokwim River, which is south of the Yukon, and empties into Bering Sea in approximate latitude 60° north and longitude 162° west. From this river they were accustomed to cross to the Yukon, striking the latter about 6 miles below the mission.

For the following description I am indebted to Mr. Zandt, a trader, who made the journey in the summer of the year 1869, and kindly furnished me with a sketch of the country. The general direction of the route, starting from the Kuskokwim, is about northwest. The journey commences by the ascent for about 5 miles of a small river called the Mahkahsatule. A short portage of half a mile is then made to Lake Kuklaelekuhta, which is about 1 mile in length. This lake is crossed, and a portage of three-fourths of a mile over a swampy plain covered with birch leads to another lake, which is a little larger than the first, and constitutes one of the sources of the Kuichavak River. Crossing this river and descending the Kuichavak for about 7 miles, the route ascends one of its branches called Oukahkl to a lake of the same name. This lake is about 2 miles in width. A small stream connects it with the next lake, which is called Koulakh, and is the largest in the chain. From Lake Koulakh a short portage is made to Lake Philikh-Tulik, which is somewhat smaller than the foregoing. A portage of 1 mile from this lake over low pine-clad hills leads to the Talbiksokh River, which is descended for about 8 miles to its junction with the Yukon. The country surrounding the lakes is generally low and swampy. The journey from the Kuskokwim River to the mission can be made by rapid traveling in two days. The distance is estimated at 55 miles. From the mouth of the Kuskokwim to

the mission the journey requires about nine days. From the head waters of the Kotelkakut River (the eastern branch of the Kuyukuk River, which empties into the Yukon a few miles above Nulato) the natives are said to make a portage to the head waters of the Quisnon, and descending this and the Tosecargut River, of which it is a western tributary, to make their way to Fort Adams. I have no information regarding the character of the country in the vicinity of these streams.

A variety of game is found in the vicinity of the Yukon River and its tributaries. I shall mention here only the kinds commonly used for food which were observed during the expedition. The fur-bearing animals are enumerated in a subsequent chapter. Moose are abundant on the upper part of the river, especially in the Ramparts, where we saw a great number in the month of September during our return journey. Lynx and bear tracks were observed on this part of the river. The black bear is the most common. At Fort Adams I saw a gray bearskin measuring 10 feet 6 inches in length. Moose are found below Nulato. One was killed, however, on an island near the mouth of the river in the summer of 1869. During the summer reindeer are abundant among the hills, especially on the lower part of the river. They are said to have diminished greatly since the introduction of firearms. We observed many herds of these animals during our journey from the Anvic River to the sea. In the months of July and August the reindeer are frequently seen in the river, where they seek a refuge from the mosquitoes. Brown and black bears are abundant on the lower part of the river. About the 1st of May vast flocks of ducks and geese make their appearance. They seek the ponds and small lakes in the interior to breed, and early in the fall they commence their departure southward. They are seen along the whole extent of the Yukon. The varieties of geese I could not distinguish. Of the ducks the teal, perhaps, was the most common, and after this the mallard. The canvasback was also often observed. Swans and sand-hill cranes are abundant, especially between Nulato and Fort Adams.

THE NATIVE TRIBES.

Owing to the rapidity with which we were obliged to travel and the time required for other duties, my opportunities for observation among the native tribes were limited. I have endeavored, however, to collect as much information as possible concerning them. The tribes that have fallen under my observation may be divided into two great classes. To these the names Orarian and Indian have been appropriately given by Mr. Dall. The Orarian tribes are those which live upon the coast, or at or near the mouths of large tributaries; the Indian tribes are those which are found only in the interior. Those Orarian tribes concerning which I can speak from personal knowledge are located between Behring Strait and the upper or Aphoon mouth of the Kvichpak or Yukon and along the banks of the lower part of the river for a distance of about 300 miles. They belong to the subgroup "Innuit" of Dall. The Indian tribes reside upon the banks of the Yukon and its tributaries to some distance above Fort Yukon. That this classification of the native tribes is a natural one is apparent from several considerations. The Orarian languages, while bearing more or less resemblance to each other, differ entirely from the Indian languages, which also seem to have had a common origin. Moreover, there is a marked difference between Orarians and Indians in appearance, dress, character, habits, and customs.

ORARIAN TRIBES.

The general name of Malemute is often applied to all these natives, but correctly there are several large tribes, of which the Malemute is one. The principal tribes seem to be the Kaveaks, the Malemutes, and the Ikvagmutes or Lower Kvichpaks, often called Magamutes, and sometimes Primoske. The Kaveaks inhabit a portion of the coast between Behring Strait and Sound Golovnin, the Malemutes are situated between the sound and Unalachleet River and at the mouth and along the banks of that river, and the Ikvagmutes are found at the mouths of the Kvichpak or Yukon and for a distance of about 300 miles along its banks. These natives are often known by the names of the villages they inhabit; but this nomenclature seems to be merely accidental and has no connection with their condition, character, or habits. They intermingle

with each other to a great extent, having been brought together during many years by their trading interests at St. Michael, and consequently there is a great similarity in their language, customs, character, and appearance. It is almost impossible to form an estimate of the number of these people, as they continually travel up and down the coast and rivers, and are rarely met with in large parties. A Russian trader of long experience informs me that in his opinion they number about 5,000.

During the winter these tribes live in their villages, trapping for skins in the vicinity, and making occasional trips to St. Michael for purposes of trading. In the summer they scatter more widely, collecting stores of food for winter use. The Kaveaks and Malemutes in their skin canoes hunt the walrus and the hair-seal, and, making their way into the valleys between the low coast ranges, kill the reindeer in great numbers. During the summer the Ikvagmutes are engaged in fishing for salmon, which frequent in enormous numbers nearly all the rivers of northern Alaska.

Most of these natives seem vigorous and healthy, and among them are many very fine looking men. In these respects the Kaveaks and Malemutes are far superior to the others, as might be expected from their more active and hazardous pursuits; nevertheless, I found among them many of the diseases incident to reckless exposure. Consumption, colds, asthma, rheumatism, and croup were by no means uncommon. Of the last-named disease great numbers of their children die yearly. The food of these people consists of fish (fresh and dried), reindeer meat, walrus and seal meat, and oil. Their villages contain from two to three dozen families, and are composed of rude, low houses, built of logs and covered with earth. The door is simply a small round hole placed near the ground, so that it is impossible to enter except on the hands and knees. The fire is placed in the center of the building, and the smoke makes its way through an opening in the roof. Rude as these houses are, they are nevertheless tight and warm. In the winter they are exchanged for houses entirely or partially underground. Nearly every village contains a large building called the "dance house," which is used as a bath house and on occasions of festivity. It also serves as a sort of hotel for the accommodation of travelers. It is similar to the other houses except in size, and does not require description.

The Orarians all wear skin clothing both in summer and in winter. The "parca" is a sort of long shirt of reindeer skin, the hair being worn outward in dry weather and inward in wet. It has a hood attached, which forms a covering for the head, and which is usually trimmed with the "cacajou" or wolverine skin. In the summer leggings and boots of reindeer skins are worn, the latter being provided with "moclock" or seal skin soles. The winter boots are entirely of moclock, and are made with so much skill that they are completely water tight. Reindeer skins being of such extensive use, are objects of great value among these tribes, and I have known them, and also wolverine skins, to be brought from other portions of the Territory by the traders to be employed in the purchase of furs. The reindeer, however, abounds in the valleys near the coast. The natives do not seem to be fond of ornaments. The upper lip is usually perforated under the corners of the mouth, and through these holes pieces of bone or bits of round stone or metal are inserted. The women tattoo their chins in vertical parallel lines. The dress of the women so closely resembles that of the men that it would be almost impossible to distinguish them but for these marks. These people, especially the lower Kvichpaks, are very unclean in their habits. Urine is used in tanning all the skins which they wear, which consequently have an exceedingly offensive smell. They use the same liquid for bathing their persons also. Their villages are filthy, and their houses swarm with vermin. They have no idea of comfort, few artificial wants, and consequently little industry. Virtue seems to be unknown among their women. They are all more or less acquainted with the use of intoxicating liquor, and the northern tribes obtain quantities of spirits from the whalers who trade with them along the coast; but as in all my experience I did not observe a single case of intoxication, I do not believe them to be intemperate. Indeed, I am told that they often resold spirits to the Russians, among whom the use of intoxicating liquors was carried to a great excess. The use of tobacco for smoking is common. They prefer a very strong, coarse variety, which they have been accustomed to receive from the Russians. The native pipe consists of a leaden bowl and a stem formed of two pieces of wood

hollowed out and lashed firmly together with a deerskin thong wound spirally about them. The bowl will contain a bit of tobacco scarcely as large as a pea; one or two whiffs and the operation is over. The effect is so powerful that for a moment they are intoxicated. Mr. Dall says that they inhale the smoke, and he thinks that the prevalence of asthma and congestion of the lungs, to which I have before referred, is due to this cause.

During the summer the natives travel along the coast and on the rivers. They have three kinds of boats—the bidark or bidárka, the bidarrá, and the bark canoe. The bidark is a long, flat-bottomed, canoe-shaped boat, consisting of a light framework of wood, tightly lashed together, and covered with oiled seal skin. This covering extends completely over the top, holes being left for the occupants. The bidark has usually one hole, but sometimes two, or even three. The traveler, having taken his seat, envelopes the upper portion of his body in a light, thin, waterproof shirt, made, I believe, of seal gut, which is fastened to the rim of the hole. Thus prepared the natives do not hesitate to venture out even in a very rough sea. The bidark is propelled with the paddle, and the skill which they attain in its management is surprising. I have been repeatedly told that the people in the vicinity of Bering Strait will turn their boats over and come up on the other side. (Dr. Kane has described the performance of the same feat by Greenlanders in their kajacks.) These boats differ little, if at all, from those of the Aleuts, of Unalaska Island.

The bidarrá is also a skin boat, closely resembling the bidark in construction; but it is much larger, and the top is not covered. It is usually propelled with paddles, but I have occasionally seen rude sails employed. Some of them will carry fifteen or twenty persons apiece, and possibly even more. This boat draws very little water, is extremely light, and easily and rapidly propelled, and has a greater carrying capacity. The objection to it as a river boat is that it is easily injured and not very readily repaired, and it requires frequent oiling to keep it impervious to water.

The birch-bark canoe is found only on the rivers. It is entirely unsuitable for coast travel. It is more common among the Indian than among the Orarian tribes, though I have often seen it among the Lower Kvichpaks. It is constructed by sewing, with spruce roots, a covering of birch bark over a strong framework of wood, and then carefully pitching the seams. The largest bark canoes which I saw would easily carry four men. The usual size is designed for one or two only.

Our journey up the Anvic River was made entirely in these boats, and I found them admirably adapted to river travel. They are light and draw very little water, and though easily injured they are quickly repaired. In the bow of each canoe a little pitch and birch bark are always kept. If a boat is injured it is taken out of the water and turned upside down. A small fire is quickly made. If the hole in the boat is small, a burning brand is held over it and a little pitch melted upon it and pressed into shape with the wetted ball of the thumb. If the damage is more serious, a patch of bark is cut and fastened firmly in the proper place by a layer of melted pitch run along its edges. The natives make these repairs very rapidly and skillfully, so that an accident ordinarily causes a delay of a few minutes only.

During the winter the natives travel in sledges drawn by dogs. The dogs are of various colors and sizes. The prevailing color on the coast seems to be a light gray. At Redoubt St. Michael there was a number of fine, large dogs, the Russians having evidently taken considerable pains in selecting and preserving the most promising. The dogs of the natives generally are miserable curs. Except when traveling they are never fed, and they are consequently always ravenous, and will devour the most disgusting filth. They often go into the water and catch fish very skillfully. They will eat any articles composed of leather, such as boots or harness, and sometimes even cloth. They never bark, but howl dismally. They are very cowardly and always slink away at the approach of a white man. The sledges are made of spruce, and most of those that I saw were shod with bone. I had no opportunity of seeing the dogs in harness, but I was informed that a team usually consists of seven dogs, harnessed two and two, with one leading. Usually a native runs before the team and leads the way. In traveling, provisions have to be carried for the dogs as well as the men, and this is a serious obstacle to long journeys.

When the country is in a proper condition for sledge traveling, snowshoes are a necessity. Those which I saw consisted of a strong, light frame, varying from 2 to 4 feet in length, covered with a netting of deer or seal skin.

The time of year during which I was among these tribes was not favorable for observing their customs. I am told that in the long nights of winter, when they are gathered together in their villages, they indulge in many curious ceremonies and festivities.

On the coast and at different points on the lower part of the Yukon the Greco-Russian Church has had for years its establishments and its priests, but I could see no traces of religious influence beyond a few natives who had been in the service of the Russian company. Owing to my limited opportunities, I did not become acquainted with any of the superstitions which these savages, like all others, are said to possess. They do not seem to have any belief in a Supreme Being, and I think it may be fairly asserted that they are without a religion.

Finally, these Orarian tribes are kind, peaceable, generous, and hospitable. I had many opportunities of judging them in these respects, and am indebted to them for cheerful assistance on many different occasions.

INDIAN TRIBES.

The Indian tribes of which I shall speak are all located on the banks of the Yukon and its tributaries. They may, for the purpose of description, be subdivided into two classes; the tribes situated on the river and below Nuclucayette and accustomed to trade principally hitherto at the Russian stations, and those near or east of Fort Yukon, who have traded principally at that station with the Hudson Bay Company only.

TRIBES BELOW NUCLUCAYETTE.

The principal tribes of which I have any knowledge are the Ingeletes and the Kuyukuks. The Ingelete people occupy both banks of the Yukon and its tributaries, from a short distance above the mission to Nulato. I was informed that one of their villages on the Yukon, about 65 miles above the mission, is called Makagamute, but other explorers have given it the name of Manki, and probably on quite as good authority. Their most important village, however, is Anvic, situated at the mouth of the Anvic River, and they have several villages on the banks of that stream.

At first observation this people might be classified as Orarian. Their character, customs, and appearance closely resemble those of the coast natives, but their language is very similar to that of the Kuyukuks, while it is entirely different from the Orarian dialects, containing, I believe, no words in common with them. Their villages and houses do not differ materially from those already described. They wear the same dress as the coast tribes, and have the same disregard for ornaments. Those on the Anvic River occasionally cross a portage to the coast, and trade at Redoubt St. Michael, and this intercourse probably accounts for the similarities referred to. Indeed, I should remark that what I have said applies to the Ingeletes of the Anvic and Yukon, and may not be true of the subdivisions of this family farther to the eastward.

The principal Ingelete tribe east of the Yukon is the Shagelook tribe, situated on the banks of the Great Shagelook Slough and River. I am informed that they are superior in many respects to the Ingeletes of the Yukon. They are said to be warlike, enterprising, and intelligent. Hunting is their chief means of livelihood. They wear a deerskin dress, and are addicted to ornaments. In a word, the characteristics which they exhibit are decidedly Indian, while those of the other Ingeletes are as decidedly Orarian.

The Ingeletes of the Yukon, like all the Indians on the lower portion of the river, are much less active and energetic than the natives of the coast. Drawing their entire subsistence with little labor from the waters of the great river, they seem utterly destitute of ambition and of any desire to improve their condition. Cowardly and degraded in the extreme, they live in constant dread of the Indians who inhabit the higher portions of the river. Nevertheless, they are remarkably honest, good-natured, hospitable, and generous.

The Indians between Nulato and Nuclucayette, at the mouth of the Tanana River, were usually called by the Russians Kuyukunski. The name Kuyukuk belongs properly, however, to a powerful tribe inhabiting the banks of the Kuyukuk River, a large tributary which enters the Yukon from the north, about 22 miles above Nulato. During the summer many of their fishing camps are seen on the banks of the Yukon. Other tribes may be occasionally met with on this part of the river, but this is certainly by far the most important. In dress, customs, and appearance these people do not differ materially from the Ingeletes. The languages of the two tribes are clearly allied. In character, however, the difference is decided. They possess few, if any, of the good traits which I have ascribed to the lower tribes. They are very cowardly, but at the same time cruel and treacherous. No trouble has been experienced from them during late years; but in the year 1851 they made a descent upon the Russian trading station at Fort Nulato, killed nearly all the garrison, and almost exterminated a tribe of Ingeletes, whose village was near the fort. I could not find anyone in the Territory who could give me a detailed and trustworthy narrative of this occurrence, and I am unable to resist the temptation to quote entire Mr. Dall's graphic account, which was undoubtedly obtained from reliable Russian sources. In memory of a brave officer, whose assassins still remain unpunished, the story may well be repeated:

For ten years, though frequently threatened, the little settlement escaped injury, Derábin meanwhile carrying on a lucrative traffic with the natives for furs. In the spring of 1851 Lieutenant Barnard, of Her Majesty's steamer *Enterprise*, arrived at Nulato with the bidárshik in search of information with regard to the fate of Sir John Franklin. He was a member of Captain Collinson's expedition, and, with Mr. Adams, a surgeon, and one man, had been left by the *Enterprise* at St. Michael the preceding fall. Being probably a blunt, straightforward Englishman, with no knowledge of Indian character and suspicion, he made the remark in the presence of others that he intended to "send" for the principal chief of the Koyukun tribe of Indians, whose headquarters were on the Koyukuk and Kotelkakat rivers, and who were then holding one of their annual festivals about 25 miles from Nulato. This unfortunately worded remark was conveyed to the chief in question, through some of the Indians at the post, by a passing native. This chief was the most wealthy and influential in that part of the country, widely known and distinguished by a remarkably large and prominent Roman nose, from which he had received a name which, literally translated, means "hump-backed nose." He was not accustomed to be "sent" for. When the Russians desired to see him they respectfully requested the honor of his presence. His Indian pride rose at the insult, and he immediately called a council to discuss the rumor. The shamáns were of course first consulted, and they unanimously declared that it boded no good to the chief in question. The council then decided that if the report proved true they would, with all the Indians there assembled, go together to the fort and demand satisfaction. They waited some time, and finally were about to disperse to their homes when a single dog-sled appeared on the river. This sled was accompanied by Iván Búlegin, a Russian, and an Indian workman of the Nulato tribe, who had been sent up to see if any information were attainable, and, if so, to bring down the Tyone of Koyukuk. The ill-fated Búlegin drew his sled up on the bank, sending the Indian who accompanied him for water to boil the chynik. Sitting down on his sled to rest himself, he was approached stealthily from behind, and, being struck on the head with an ax or club, was instantly killed. The sled was dragged away and plundered. When the Nulato Indian returned and saw what had been done ne turned to run, but the Koyukuns called to him, saying, "Are you not one of us? We will not hurt you." Overcome by fear, he returned and unwillingly assisted in the atrocity which followed. Búlegin's body was stripped, the flesh cut in slices from the bones, and the savages, infuriated like wild animals by the sight of blood, roasted these remains and devoured them. An Indian who noticed the reluctance with which Búlegin's companion joined in the hurried feast, crept up behind him and drove his knife up to the hilt in his neck. The fighting men present then stripped themselves of all incumbrances except their bows and arrows, and putting on their snowshoes, set out at once for Nulato. Less than half a mile below the trading post were three large winter-houses crowded with Ingaliks of the Nulato tribe, in all about a hundred men, women, and children. These houses were situated near the river bank, a few rods northeast of the mouth of the Nulato River. It being in the month of February and an unusually warm spring, the Nulato Indians had taken the precaution to clear away the snow from above their birch-bark canoes, 40 or 50 of which were lying about. Intending to forestall retaliation for the death of Búlegin's companion, the Koyukuns approached with the greatest quietness, not to disturb the sleeping inmates. The canoes were seized, broken up, thrust into the apertures in the roofs and the narrow underground entrances of the houses, and fired. The frightened inhabitants, wakened by the noise and crackling of the flames, endeavored vainly to force a passage through the fire. Some of the men, seizing axes, cut their way out through the wooden walls, but were mercilessly shot down by the arrows of the Koyukuns. Many suffocated in the smoke. A few women were taken by the victors, and one or two children were able to save themselves in the woods, through the negligence or pity of the conquerors.

A young man called Wolasátux, renowned for his skill with the bow, escaped to the mountains, eluding the vigilance of the pursuers by his swiftness of foot. All the rest were smothered or fell beneath the knives and

arrows of the assailants. But little noise was made, except by the screams of the women and shouts of the destroyers, for at that time the Indians had no guns. The slumbers of the Russians were not disturbed.

It is said that two Indian women, who were employed at the fort, having risen early to boil the chyniks for the morning meal, heard and understood the cries of the victims, but, overcome by fear and anguish at the death of their kindred, stupidly shut themselves into the cook house, and did not alarm the Russians.

The Koyukuns next made for the trading post and found the bidárshik, just risen, sitting behind one of the houses. Saying to Iván, one of their tribe, who had been employed at the fort as interpreter, "If you do not kill the bidárshik, we will kill you," they forced him to consent. He approached Derábin and stabbed him in the back repeatedly, so that he fell to rise no more. The Russian interpreter, a man said to have understood seven languages, happened to come out, saw the act, and turning unarmed to the Indians upbraided them for the murder, but fell in the doorway pierced with seven arrows. Rushing over his prostrate body, they entered the house. Barnard was lying on his bed reading; at the sight of the hostile Indians he raised himself up to reach his gun, which hung above his head. Twice he fired, and twice the barrel was struck upward, the balls taking effect in the ceiling. An Indian shamán, christened Larriówn by the Russians, and his brother seized the arms, and one plunged his knife into the Englishman's abdomen, so that when it was withdrawn the intestines followed it, and he fell back mortally wounded. Several shots were fired, and one struck Larriówn in the groin. Three children and their mother were killed; their father, Teléezhik, being absent in the Kaviak Peninsula, as interpreter, with Captain Bedford Pim.

Leaving the bidárshik's house, the Indians next attacked the casármer or room where the workmen lived, where there were two Russians and several creoles. They had barricaded the door, and, being at some distance from the other house, knew nothing that had happened. One of them aimed through the window at the crowd of Indians; when the other, hoping to avoid bloodshed, advised him to fire above their heads, in hope that they would disperse. The crowd separated, but did not retreat, and only answered by a shower of arrows. The next shot, better aimed, killed one of the Indians, when a panic seemed to seize them, and they immediately retreated with their booty and prisoners to Koyukuk. Larriówn sat in great agony in the outer room of the bidárshik's house. A Russian lay in the inner room, helpless from fever, who had been overlooked by the Indians in the excitement. His wife, an Indian woman, named Maria, brought him a loaded pistol, and held him up while he fired at the shamán. His trembling hand could not direct the ball, and Larriówn dragged himself out to the river bank. Here he found a Koyukun woman, who had been staying at the fort, with her baby and a little sled, which she was drawing by a band over her forehead. He threw the child into the snow, and ordered her to draw him to Koyukuk. She refused, and he stabbed her to the heart. How he finally got away no one knows. Thus ended the Nulato massacre.

An Ingalik, named Lófka, was sent by the Russians with a letter to the redoubt. He placed it in his boot fortunately, for he was stopped on the river and searched by two Kuyukuks, who suspected his errand. Finding nothing, they let him go.

Mr. Adams, the surgeon, immediately started, with Teléezhik and a party of Russians, for Nulato. Captain Pim, having returned from his adventurous journey frostbitten, could not accompany him, and remained at Unalaklik.

The Russians had sewed up the wounds; but before Mr. Adams arrived Lieutenant Barnard was dead. It only remained for him to perform the last and sad offices and to erect a cross over his grave, with the following inscription:

"Lieut. J. J. Barnard, of H. B. M. S. *Enterprise*, killed February 16, 1851, by the Koyukuk Indians.—F. A."

The Russian American Company, as is the wont of trading companies, never took any measures of retaliation for this massacre. Larriówn and Iván, the murderers of the bidárshik, are frequent visitors at the fort. Presents were sent to the Koyúkun chiefs, and there the matter ended. A stockaded fort was soon built on the present site, and the graves of Barnard and Derábin lie a stone's throw behind it. The excavations where the Indian houses stood are still to be seen, and form the graves of those natives who perished by the massacre.

The complete success of this affair has undoubtedly been the occasion of what I take to be the most prominent characteristic of this tribe—their intolerable insolence. They look at a stranger with an impudent, half-threatening stare. They are, however, too cowardly to offer open violence. They are sometimes, although not usually, dishonest. One of them, having appropriated some small articles, received a sound thrashing from an American trader of our party, to his intense disgust and astonishment; but he made no resistance.

The people who inhabit the banks of the Tanana River, the principal tributary of the Yukon, are called Tenan-Kutchin[1] ("People of the Mountains"), and are known at Fort Yukon as Gens des Buttes. They do not frequent the Yukon during the summer, and consequently I saw very few of them. In the early spring they descend to the mouth of the Tanana and make their camps at Nuclucayette, where they meet the traders and dispose of the furs which they have collected during the winter. They are said to be active, intelligent, and enterprising,

[1] I give this name on the authority of Mr. Dall, as I did not happen to hear it applied to them. There can be no doubt that this is one of the Kutchin tribes.

but violent and warlike. They live principally by hunting. They are much addicted to the use of ornaments, such as beads and feathers.

The influence of the Russian Church (if it had any influence) did not extend beyond Nulato, and no attempt has ever been made to instruct or civilize the Indians of this part of the river. Their superstitions are endless; every tribe has its medicine man. But I had no opportunity to obtain any connected idea of their beliefs or worship.

The Tenan-Kutchin and the Indians of Fort Yukon are occasionally met with between Nuclucayette and the Ramparts. Beyond this point there are no Indians until we arrive at Fort Yukon.

The principal tribes which have been accustomed to trade at this post are the Kotcha-Kutchin (or "Lowlanders"), who live between the Porcupine and Yukon rivers, near their junction; the Hun-Kutchin, or Gens de Bois, and the Tutchone-Kutchin,[1] or Gens des Foux, who inhabit the Upper Yukon, and the Porcupines, or Gens de Rat, who live upon the banks of the Porcupine or Rat River. There are undoubtedly other tribes, but these are all that I have noted. These tribes have all been classified under the head of Northern Tinneh.[2] At Fort Yukon the general name of Loucheux is applied to them. I had no opportunities of visiting any of their villages, which are all distant from the fort, and consequently I know very little about them. A few trading parties came to the station during our visit, and among them were the finest Indians that I have ever seen. The women are virtuous; the men are brave, manly, intelligent, and enterprising. They are said to be essentially a commercial people, trading for furs with other tribes and disposing of them again to the white traders. Some of them were very much interested in my operations, and I found no difficulty in making them comprehend, through an interpreter, the general method and purpose of my astronomical observations. Indeed, they are accustomed to note time roughly by the relative positions of stars. Their clothing is of moose skin, with the exception of a few articles which they obtain by trade. They fish little, and are almost exclusively engaged in trading furs and hunting the moose, which abounds in these parts.

For a number of years past a missionary of the Church of England has been stationed at this post. The influence which he has exerted has been of great benefit to the natives; and although little has been done toward civilizing them, they far surpass all the other tribes of the river.

TRADE OF HUDSON BAY COMPANY.

BUILDINGS.

The only establishment which the Hudson Bay Company has occupied on the Yukon River during late years was Fort Yukon. In the year 1847 employees of the company descended the Porcupine River and established this station at its mouth. Trading goods and supplies were brought from Fort Simpson, on the Mackenzie, to Lapierre House, on the Porcupine, to which place a party from Fort Yukon annually ascended to receive them and deliver their furs.

The force at the station usually consisted of one chief trader and two or three men. The chief trader received about £100, the men about £25 each per annum. Whenever any material was needed for clothing, whether buckskin, fur, or cloth, it was purchased at a fixed, and usually pretty high, price from the company. The men were not allowed, under any circumstances, to trade with the Indians on their own account.

Owing to the difficulty of transportation the supplies sent to this station were very limited in quantity. The chief trader received an allowance of tea sufficient to last a year, and sufficient sugar and flour to last a month or two. The men received only an allowance of tea. All other supplies were drawn from the country.

From this brief statement it will appear that the business of the station was conducted on the lowest possible scale of expense. The skins obtained were principally those of the stone marten or American sable, mink, beaver, otter, black bear, white, red, black, and silver-gray

[1] I borrow this name also from Mr. Dall, as the latter name was only noted.

[2] Bernard R. Ross, esq., Smithsonian Report, 1886, p. 303.

foxes. The most valuable skins are, I believe, those of the black and the silver-gray fox, comparatively few of which are obtained; and next to these are the beaver and stone marten.

Little or no trapping was done by white men. The furs were almost without exception obtained by barter from the natives. A regular scale of prices was established, the beaver skin being the standard. Thus the price of a gun was eighteen skins. If martens were offered they were taken at the rate of two to one beaver skin, and inferior furs were received in a similar manner, according to their relative value.

The following list shows the kind of goods at Fort Yukon in the year 1869: Guns, double and single barrel, made in London; pocketknives, one and two blades; pants, ordinary and fine; white flannel shirts; red flannel shirts; calico shirts; "yacht" shirts; prints; heavy cloth; blue striped drugget; white striped drugget; shawls, large and small; cotton drill; bullets, twenty-eight to the pound; shot, No. 4; butcher knives; tin pans, various sizes; tin cups; metal buttons; pearl buttons; linen thread, skeins and spool; silk handkerchiefs; cotton handkerchiefs; silver rings; capotes (overcoats); neck-handkerchiefs (black); Paris neckties; English belts; Canadian belts; gunpowder; ribbon (wide); ribbon (narrow). With the exception of gunpowder, of which about 1,200 pounds were disposed of annually, there were but small quantities of these articles on hand, the difficulty of transporting goods from York Factory to Fort Yukon preventing the importation of large supplies.

Furs were obtained at this station in two ways—first, by trade with the tribes inhabiting the vicinity and those on the Porcupine and Upper Yukon; and, second, by descending the river in boats early in the spring and trading with the tribes at Nuclucayette. Probably about half the furs annually collected at this station were purchased at the mouth of the Tanana.

From the imperfect data which I have been able to obtain it is difficult to fix with anything like accuracy the annual trade at this station. It has been estimated at 10,000 skins, a number which is perhaps somewhat in excess of the truth. Five thousand skins, principally martens, are said to have been purchased by English traders in the spring of 1869 at Nuclucayette.

The fur trade on the lower portion of the river below Nuclucayette was conducted, previous to the transfer of the territory, entirely by the Russian American Company. This company had a number of stations on the river and coast, the principal of which were Unalachleet, St. Michael, Andreavsky, Mission, and Nulato. As the employees of this company had left the country before my arrival, there were no sources of information from which to estimate the amount of trade. From the best information which I could obtain, American traders, in the season of 1868–69, collected about 10,000 skins between Nuclucayette and the coast.

The buildings on St. Michael Island (Michaelovski) consist of the "redoubt," a small chapel belonging to the Greek Church, and two or three small log houses put up by American traders.

The buildings which constitute what is called the "redoubt" I presume to be, under the terms of the treaty of cession, the property of the United States, referred to in my instructions as public buildings. They are all within a rectangular inclosure, formed partly by the buildings themselves and partly by a stockade. The stockade is loopholed and the inclosure flanked by two small towers.

The houses are constructed of drift logs. The following list exhibits their number, capacity, and condition: Three storehouses, 2 in good order, 1 in need of repair; 1 barrack for unmarried men, 2 rooms, could accommodate 20 men, in good condition; 1 barrack for married men, 1 large and 1 small room, needs repair; 1 house, 4 small rooms, in good condition; 1 house, 2 rooms, in good condition; 1 house, 4 rooms, in good condition; 1 bath house, 2 small rooms, needs repair.

At Unalachleet, Andreavsky, Mission, Nulato, and Fort Yukon, there are also log buildings which are presumed to be public property. They are all in poor condition, except those at Fort Yukon, which are superior to any others on the river. They are of no value to the Government.

RESOURCES OF THE COUNTRY.

The information which I have been able to collect concerning the resources of the Yukon River is too uncertain and limited to justify conclusions. The remarks which follow will therefore be very general in character, and the opinions which I advance may be much modified when more accurate statistics are obtained.

In the examination of this subject the fur trade demands the first consideration. Indeed, it is the only resource of the country as yet developed. This trade has been heretofore in the hands of two companies, the Hudson Bay Company, having one station at Fort Yukon, and the Russian American Company, having various stations along the lower part of the river and on the coast.

I have before remarked that the business of the Hudson Bay Company was carried on at the very minimum of expense, and the same may be said with reference to the Russian Company. The Russian force on the Yukon consisted principally of men sent from various places in the Territory who had been guilty of crimes and misdemeanors. The English force at Fort Yukon consisted of men far from civilization, without means of transportation, and usually, by reason of debt, in the power of the company. The employees of both companies were practically slaves.

It is scarcely necessary to remark that the business of collecting furs can not be conducted in this way by Americans. In the summer of 1869 traders in the employ of American companies were receiving $80 to $100 per month in coin, while men occupying corresponding positions in the Hudson Bay Company were paid £5 per annum. The former required a large and expensive variety of supplies and could not be engaged on any other terms. The latter may be said to have practically subsisted on the country.

It is remarked that the Hudson Bay Company, in abandoning its station, does not necessarily lose the trade which it enjoyed at Fort Yukon. A large portion of the business was conducted with tribes living in or near the English territory, and these people, having been accustomed to trade with the company for many years, will carry their furs to Lapierre House, on the Porcupine, or to the new station which will probably be constructed near the boundary.

The trade which will be controlled by Americans will therefore be that of the Russian Company, increased by the number of skins annually obtained by the English at Nuclucayette. I suppose the aggregate from both sources does not exceed 15,000 skins.

The geography of the river and adjacent territory controls in a marked manner the character of the trade carried on upon the Yukon. In previous chapters I have remarked that the river runs in many places with a swift current; that it is filled with shoals and difficult of navigation even for small boats; and that there is not sufficient water at any of its mouths, as far as has been determined, to float a vessel of sufficient size to voyage upon the sea. Vessels, therefore, which come to the coast for furs must lie at St. Michael, and the river must be ascended and the different points of trade visited in boats. Owing to the condition of the ice in Bering Sea a vessel can not reach St. Michael Island much before the middle of June. A trip in open boats to Nuclucayette would then require the whole season, leaving no time for return. Such a journey would be found extremely difficult, as trading goods and provisions would have to be transported, and very unprofitable, since few good furs would be obtained, as the summer skins are worthless.

From these remarks it follows that a profitable management of the fur trade of the Yukon requires the establishment and maintenance of permanent stations on the river. This is no place for small enterprises. It is impossible for sloops and schooners to run in and rapidly trade with the natives, delaying only for a few hours or days, as can be done in some other parts of the Territory.

I suppose about 5 stations are required to collect, with convenience, the furs on the lower part of the river, and for these there will be necessary a force of about 15 men. Whether the amount of trade will justify the expense of such an establishment, including the cost of transporting goods, supplies, and furs to and from the river, remains to be seen.

A brief account of American enterprises on the Yukon since the transfer of the Territory to the present time will not be uninstructive.

The company on whose vessel I traveled established its stations on the Yukon in the summer of 1869, during the journey described in this report. Upon our arrival at St. Michaels Island we found the stations of two companies, both of which had been engaged in the trade since the transfer of the Territory. Before our departure one of the companies abandoned the business and sold its stock to the new company. A large sloop, with a complete stock of trading goods, had arrived about the same time, for the purpose of opening an establishment. The owner, however, did not appear to think the prospect encouraging, and he also sold out to the new company. As for small vessels, many of which visited Norton Sound during the year following the transfer, they in every case went away empty-handed.

When I left St. Michael Island in the fall of 1869, the condition of affairs was this: two powerful and determined companies, having abundant capital, occupied various stations on the river and coast, and an active competition had commenced. This was certainly calculated to develop the fur trade to its utmost extent, yet I am informed that the result was a loss to both parties; and in the following year the companies combined, having found that the trade could not be profitably divided.

I have already said that the statistics are not sufficiently exact for accurate conclusions; nevertheless, it appears to me that a better idea of the value of the trade may be gathered from the general statements I have given than from the statistics of the old companies, which existed under vastly different conditions. At least one deduction may be drawn from the facts: the amount of trade in furs on the Yukon River will at most furnish a business for one company, and employment on the river for about 15 men.

The timber of the Yukon River may in the distant future become of considerable value. It consists principally of spruce, poplar, birch, alder, and willow. The spruce and birch are the only varieties of any value for practical purposes. The former is very abundant upon the upper and middle portions of the river. It does not usually grow to a large or even medium size, and at Fort Yukon, where I had occasion to use a good deal of it, it did not appear to be of very good quality. Birch is comparatively scarce. The lower portion of the river for a distance of about one hundred miles from its mouth is devoid of trees. The timber of the Yukon River can not for many years become an article of commerce, because large supplies, superior in quality and much more accessible, exist nearer the market.

The waters of the Yukon swarm with a variety of fish, the principal of which is the salmon. This fish is found in almost incredible quantities, especially on the lower portion of the river. The fish of the Yukon can not, however, at present become an article of commerce, because a sufficient market has not yet been found for the salmon of the Columbia River and Puget Sound, while the southern rivers of Alaska are equally prolific, and yet almost untouched. Moreover, the cost of labor is too great; Indian labor is not to be depended upon for this or any other purpose.

The region bordering the Yukon can not properly be said to have any agricultural resources. I shall not attempt to discuss the question as to what grains or vegetables may, by careful preparation of the soil, be made to grow, because it seems to be a question of little practical consequence. A reference to preceding chapters will prove sufficiently the fact that this portion of the Territory is not of such a character as to invite the immigration of an agricultural population. Hence, agriculture in this region will at best be merely an auxiliary or incidental occupation of persons principally engaged in other pursuits. But the fur-trader is not usually a willing tiller of the earth, and even under the most favorable circumstances the utmost efforts of a dozen or fifteen men would scarcely be sufficient to develop, in this direction, an important industry.

No valuable mineral deposits in workable quantities have been found in the vicinity of the Yukon River up to the present time.

REPORT OF A VISIT TO ALASKA IN JUNE, 1875.

BY

MAJ. GEN. O. O. HOWARD.

A VISIT TO ALASKA IN JUNE, 1875.

By Maj. Gen. O. O. HOWARD.

I left Portland for Alaska on June 2, 1875, and proceeded on my voyage by way of the North Pacific Railroad, Puget Sound. I chose for the water part of this expedition the steamer *California*, which left Victoria in due season. At Port Townsend I took the steamer *Wolcott*. I had hoped in doing so to reach Sitka in time to enable me to go to parts of Alaska. The *Wolcott* being limited in the amount of fuel to burn, it took her a long time to make the voyage. I was much disappointed in this, for I hoped to have seen more than I did of the inhabited portions of Alaska.

We spent the 5th at the English post Nanaimo, enabling me, with the officers of the court-martial accompanying me, to visit the extensive coal mines there. Some idea of their extent may be gathered from the fact that from $25,000 to $30,000 per month are here paid, on an average, to the workmen, or disbursed in connection with the mines.

I made some observation of the condition of the Indians in this neighborhood. They number not far from 200; most of them are pretty well dressed, and have clean faces. The only regular school is a small unimportant mission of the Methodists. In characteristics these Indians are like those with Father Chirouse at Tulalip, and elsewhere on Puget Sound.

The voyage from Nanaimo to Wrangell was exceedingly pleasant. The gulfs and sounds, not rough at this season, are connected by the straits and passes that seem like a succession of beautiful rivers. A wall of magnificent mountains, often from 2,000 to 3,000 feet in height, rises on the right and left, covered with trees and snow-crowned; cascades dropping hundreds of feet; streams coursing like silver threads down the mountain sides; snow-slides and an occasional glacier; every such natural feature that travelers go far to see here meets and delights the eye. Notwithstanding official reports and conversations with officers and voyagers to Alaska, I never before realized the fact of this beautiful, sheltered, and comparatively safe inland passage from Port Townsend, or any part of Puget Sound, to Sitka. It is apparently not nearly as dangerous as the rapids of the Columbia, over which the steamers of the Oregon Steam Navigation Company are passing every day. But it requires steady care and much experience to know when, where, and how to pass the swift currents of the several narrows.

By 2.30 p. m. Tuesday, June 8, we were at anchor near Fort Wrangell. I first made a thorough inspection of the detachment and post. Lieut. John A. Lundeen, Fourth Artillery, was in command. He had with him Lieut. M. M. Macomb, Fourth Artillery, and 12 enlisted men. The stockade and buildings appeared in a fair state of preservation, and the condition and discipline of the command good. The garrison being small, he rented and occupied only a part of the stockade inclosure, so that he was necessarily more or less exposed to annoyance from people who were not connected with the Army. He reported successful attempts to manufacture strong drinks for sale to Indians and others near by, which he had not had the facilities to reach and hinder. I authorized him to employ a canoe for this work when the distance rendered it practicable. Major Campbell's vigorous administration had already had an evident effect on this part of Alaska to check and almost prevent the illegal traffic in spirituous liquors. As soon as the inspection was over the Indians from the "ranches" (as their long rows of houses in plain sight are called) came with dejected looks to interview me. They fortunately had a prime interpreter in Mr. Alexander Choquette, who speaks English and the Stickeen (Thlinket tongue) with equal

readiness. The complaint was that we had taken away their chief, Fernandeste, by force; that our people (the accused prisoners, no doubt) had so frightened him as to the consequences of his detention and journey to Portland, that in terror he took his life; that his immediate relations were worried almost to madness by the sneers and gibes of other Indians, who said they were cowards because they did not have their "revenge" or "settlement."

I learned that under the influence of this passion and drink an attempt had been made more than once to kill a white man, and that the promise of a "settlement" by me was what the Indians rested in. Now that I had come, they thought I would make it all right. They made several urgent requests, but finally settled on the condition of a "potlatch" of 100 blankets and the dead body of Fernandeste. Having already obtained the permission of the Secretary of War for the issue of blankets, and having the body of Fernandeste with us (it having been disinterred at Astoria and put on board), I deemed it the wisest plan to yield to their fervent entreaty, and gave the blankets and body. The whole appearance of the Stickines changed. That night they gave us a characteristic dance of satisfaction, depicting in their rude way the departure, the suicide and return of Fernandeste, our visit, and the settlement.

The next day, by the courtesy of Captain Irving, the owner of the small river-steamer *Glenora*, having arranged to pay merely the extra expense of fuel, I took our party up the Stickine River as far as the boundary between our territory and British Columbia. No building had yet been erected for the custom-house. The place for the English custom-house officers' tents is supposed to be selected within the British line. Some of our shrewd frontiersmen say that it is not 10 marine leagues from the sea, as it should be, there being really doubt as to the summit of the coast range of mountains. It seems now to an observer of little consequence among these rough mountains where the exact line of division really is; but, remembering the trouble the settlement of the channel question gave us at Vancouver Island, I deem it of sufficient importance to recommend that the attention of the proper department be called to the existing doubt, not plainly settled by the treaty, that the line may be definitely fixed.

I obtained from a civil engineer, Mr. Wright, who journeyed with us up the river and guided us to the immense glacier and to the hot springs a few miles above the boundary, a recent sketch of the Stickine River, drawn by himself; also an excellent topographical map, quite in detail, of British Columbia. The largest of the two glaciers that we saw appears about 2½ miles in breadth and is said to extend 25 or 30 miles back. It is evidently moving slowly toward the Stickine, with its immense pile of débris of gravel, blocks of granite, and crushed rocks of all kinds along its front. The hot springs form a short confluent of the Stickine, 2 miles above and on the opposite side of the river. They do not differ from other springs that I have visited, except in the great abundance of the flow, and in the great heat, the water being so hot as to scald the hand, at the sources.

We were back at Wrangell at 6 p. m., and were soon on the way to Sitka, by the outside. Here was the only part of the entire passage where there were any symptoms of seasickness among the passengers. We came to our anchorage at Sitka on Thursday evening, June 10. At 9 a. m. Friday I made my inspection. As every inspection has shown, the command was in fine condition. Many of the buildings, from long use, needed repairs, but their police was excellent. The guardhouse had been thoroughly renovated, the cells rearranged and fixed for light and ventilation. It was the best, considered in all respects, that I had seen in the department. I authorized some repairs and changes that were so urgent as to demand immediate attention; for example, the repair and extension of the stockade. As it appeared at my inspection, there was no real separation between the commanding officer's quarters and the Indian village. This was the cause of constant danger and annoyance, which would be prevented by the proposed stockade extension. Several of the buildings showed rapid signs of decay. The flooring of the rampart surrounding the castle was so rotten that it was dangerous to step upon. The hospital building was at an inconvenient distance from the garrison, and the commanding officer urged a change to a building inside. I authorized the change, and suggested to Major Campbell, acting as Indian agent, to use the other building vacated for general asylum and hospital purposes.

Having been troubled by numerous newspaper charges concerning the present management

of affairs at Sitka, I deemed it best to give those who were called citizens, consisting of Russians, Aleuts, half-breeds, American and foreign traders now residing in the town, the opportunity to see me apart from the officers of the garrison.

In keeping with this purpose I met them by appointment at the house of the United States collector, Mr. Berry. Mr. Berry kindly briefed the complaints, which I subsequently carefully considered and acted upon.

The complaints did not prove to be of much importance; certainly not very grievous. To remedy the real ills of the complainants, most of whom were indigent people, I advised Major Campbell to introduce a few police regulations, establish a general hospital, and raise a small revenue, just sufficient to meet the necessities, and detail one of his humane officers to act in the capacity of a police judge. I did not order these things, because, as military commander, I wished to assume no doubtful powers, but was confident that the law under which Major Campbell was to exercise jurisdiction as Indian agent in an Indian country would warrant his doing everything that humanity required for the relief of a community suffering from being within the limits of the United States and yet absolutely without law.

The instructions from General Halleck, and transmitted from one commanding officer to another, did imply that military government should be extended to the Alaska people till Congress should otherwise provide. But the late decision of the Hon. Judge Deady, United States district court, limiting military jurisdiction to the execution of the liquor law, made it necessary to be exceedingly cautious. I wish to renew my earnest recommendation that, by proper and speedy legislation, Alaska be attached as a county to Washington Territory, or in some other way be furnished with such a government as the treaty with Russia in the transfer plainly contemplated.

With a few gentlemen I spent Saturday, June 12, in moving around and exploring Baranoff Island to the point where the road from the different mines emerges at the landing, distant, perhaps, 20 miles from Sitka. We ascended the mountain (for here it is nothing else but a wooded mountain) 3 miles. The first mine had been opened and a considerable quantity of rock thrown out, but was not now worked. The second one, Stewart's, belonging to the Alaska Gold Mining Company, half a mile higher up, presented about the same condition—no one at work. There were evidences of a fair yield of silver and gold in several specimens that I examined. Some 1 or 2 miles farther up the mountain our party met half a dozen Sitka Indians carrying bags of quartz upon their backs down the fearful road from the upper or Francis mine. I was struck with the ease with which these muscular Indians carried enormous loads of broken stone, loads I could hardly lift from the ground. The mountain was covered with timber—hemlock, fir and cedar, the hemlock prevailing.

A log building had been constructed at the second mine (Stewart's) of the celebrated Alaska cedar, of large size, yet here this timber was not very abundant. The ground en route was springy for the most part, covered with a soft soil coated with mosses. At intervals in the ascent a shelving or slaty rock appeared. The trees for the most part were large and very high, often reaching 200 feet, and the pathway obstructed by decaying logs of vast proportions, sometimes 8 or 10 feet through, crossed by steps cut in their sides. We traversed Silver Bay on our return—a water, narrow like a river, hemmed in by mountainous islands, and remarkable for its quiet surface, which clearly mirrored the rugged and lofty shores in its depths. The few glimpses at the islands here showed me how difficult a matter it is to prospect the country, but it convinced me that in time patient exploring and prospecting would show more abundant mineral resources than the present few openings, made with so much labor and expense.

Sunday, June 13, in the morning, I attended the Russian religious service, conducted according to the ritual of the Greek Church. The cathedral is undergoing repairs, so that the morning service was held at smaller rooms, at the priest's house. The ceremonial is impressive; men, women, and children stand or kneel during the exercises; little boys help in the singing, as in Catholic and some Episcopal churches; all attendants, perhaps one hundred people, mostly those who speak the Russian tongue, were neatly dressed and devoted in worship. I wish I could report that the morality of the priest and people was equal to their devotion. He was reported

frequently for drunkenness, and among the people (perhaps not the worshipers) for licentiousness. There is no minister for the Lutheran chapel; a lay service was improvised at 11 a. m., of song, reading the Scriptures, and speaking, well attended by the garrison. In the evening, by special appointment, I addressed the people; the house was full; a portion of my remarks were translated into the Russian language. I tried to show a depressed people what I believed to be a sovereign remedy, that they themselves could apply, for the ills that afflicted them; but I could not fail to see that our Government has not carried out in good faith the treaty stipulations made at the time of the purchase of the Territory.

Good civil government, as well as religious and secular teaching, is nowhere in heathendom more needed than in Alaska; and yet up to the present there is none.

At 2 o'clock p. m. I met the Indians and had an interview with the chiefs and people. Sitka Jack was absent. He controls at least one-half of the households (in each house there are usually a family and branches, sometimes numbering twenty or thirty people). Anahootz, the chief who governs the rest, spoke at the meeting for the whole. He first submitted his recommendations from prominent officers, Russian and American, of sea and land. He was supported on right and left by an adopted father and a wealthy young Indian. Anahootz said, in substance:

Ever since Gen. J. C. Davis came here I have tried to live on terms of peace and good will with the whites; nine of my people have been killed or wounded by white men long ago; now I have the best of feelings; recognize the fact that the present "Boston Tyce" (commanding officer) was not responsible for the acts of those before him.

The first whites seen among the coast Indians were from Boston. They call all whites "Boston" men, or women.

No troubles now, for Major Campbell had a just way of punishing the Indians. My people never had trouble with the Russian authorities; but there had been difficulty under the five predecessors of Major Campbell; now surely the Indians had no cause of complaint. They do have hard feelings against some of the storekeepers here, who treat them like dogs. The price the Indians received for cutting wood was better when it sold for $5 than now, when it sells for $2. They are paid for labor with a little hard-tack or flour; and if they complain are kicked from the stores.

Anahootz does not think his Indians go to British territory for blankets, but spend most of their money here at Sitka. Indians from other places certainly did this.

I object to payments in trade. My people are just beginning to arrive at what I have long desired—amity with the whites and with each other, under the protection of a good chief. I have had many battles in maintenance of this, and my people are just beginning to see that I am right.

I spoke to him of the education of his children, as the best means of inducing mutual understanding, and of diffusing knowledge of our ways, and advised him to lay the subject before his people. He approved. He had "spent sleepless nights thinking for the interest of his people. Wanted a good teacher. Would build him a schoolhouse. A teacher once came, but did not stay." Then I addressed all the Indians, urging education and industry and cooperation with their good chief. They heartily assented; hoped the traders would give them better pay, that they might be better dressed next time I came.

Here, as elsewhere, the Indians seem to have abundance of food; they paint their faces (in part or in full) black, making them present often a hideous appearance. They seem generally well disposed and are learning to surrender the idea of revenge for the death of a friend. One prominent Indian (a hereditary chief, Anheka by name) brought me Major Tidball's written statement that though his relative had been killed he had acted rightly in the matter and abstained from acts of revenge. People reported that these people had no idea of chastity. I doubted the statement. It was as fair to infer from the practice of some white men here that they had no just ideas of chastity. Surely they had not improved the Indians by their precepts or their practice, though, of course, they knew that adultery was forbidden by civil and divine law. The Indians seemed glad to conform to the marriage law in the British territory, on Puget Sound, and in many other places, where they got a decent example.

Tuesday morning, June 14, the court-martial having adjourned, we proceeded northward, by the steamer *California*, passing through Peril Straits. Here, as farther south, were narrow and deep passages of water, flanked by high, snow-crowned hills, covered with rocks and trees, and frequent cascades. We stopped at the Koutznous Bay, and rowed a small boat around a

point 4 miles to the north, along Admiralty Island. In a pleasant little nook we came upon the Indian village. Here the island was comparatively low, had some open cultivated land; potatoes were planted like celery in Eastern gardens, and said to do well; they promised to obtain a fair crop of turnips, cabbages, beets, and parsnips. The cleared land, not otherwise occupied, had on it good grass. The island is the one General Davis spoke of as better located for a post than Sitka. The Indians were like those at Sitka; seemed to be hearty and fat, living in the same sort of houses as the coast Indians generally in the northern country. The houses had a pitched roof, quite broad and flattish, one door under the gable (of different shapes in different houses), just big enough to crawl through. You generally ascended to it by a few steps. The frame was of very large beams, and the planking always of large and thick material. I measured single planks 4 feet broad, 6 inches thick, and 60 feet long. The houses, I judged, were generally 60 feet along the front and 80 feet back. In the best of these there was a brick or paved square for hearth and fire at the center, under an opening in the roof; around this square, a few feet back, a nice banquet terminated inward by a handsome single plank, standing on edge, of 3 feet in breadth. This plank was often carved and colored, looking like the inside of the canoes. On the top of the banquet were usually a few small sleeping rooms. Over the fire were pots, kettles, poles, with salmon drying and smoking; skins, furs of different kinds, were thrown upon or against the banquet. I saw, too, curious square casks, waterproof for the fish oil; and well-made water-tight trunks, that the Indians used in their canoes on long voyages.

In one house we observed a very large-sized Indian, with finely-shaped head and high fore-head. He was wounded in an Indian skirmish some years ago. His leg was fixed straight by props; his knee swollen to perhaps three times its natural size; his toe nails, uncut, had grown long and pointed. He lay there on the floor with great patience. His wife seemed ill and was moaning, apparently with great pain, at the door of a banquet room.

The Koutznous treated us with much kindly attention and told us they did not want Sullivan and his partner, who lived near by and ran a small schooner in and out, with liquor, to stay there. One woman and one man took their part and chided the other Indians for telling us. These traders understand the game of getting them partially drunk in order to buy their furs, oils, etc., cheap. Sullivan, who is a decrepit old man, lost his partner by sickness and death before our return, and Major Campbell thinks Sullivan is too old and weak to do much more mischief. Thus far, attempts to catch him at his illicit trade have not been successful.

Wednesday, June 14, at daylight, we were anchored at the mouth of the Chilcat River. The strong, cold wind lashed up the waves and everything appeared wild and dreary. The Chilcat Indians were paddling around the steamer. They appeared thin in flesh, but very tough and hardy; not so well clad as those at Sitka. In other respects, language, size, and features, like them. Here Sitka Jack, of whom I have spoken, with his canoe thoroughly manned with paddles and carrying a United States flag in the stern, came up to us in style, and was welcomed on board the *California*. He piloted our rowboat over the flats to the small Indian village 4 miles up the river; told us that the main Chilcat ranches are some 16 or 18 miles farther up. The village we visited was under the shelter of an immense mountain. It was similar to that of the Koutznous. Here I met an Indian woman from the interior. She said, and others confirmed it, that two days' rowing and walking brought them to a level and open country; that the Indians, speaking a different tongue from the Thlinket (the Sitka language), were very numerous there. We found here an enormous meteorolite and tried to get it for the Smithsonian, but some prospector, now up the Chilcat, had engaged it and the Indians were keeping it for him.

Having passed in the night from Lynns Canal southward and to the east into Stephens Passage, I found myself at 4 a. m. in sight of another Indian town. Choquette, the interpreter, and I started in a ship's boat for the town, skirting a rough, wooded shore to our left. Suddenly a small dog appeared, barking and moaning; judging from this circumstance, I concluded that the Indians had left. Going on shore we found the dog, poor, almost starving, watching an Indian cache in the edge of a wood. Afterwards, meeting a boat load of the Indians, the Awks, they told us there was not a single person in the town; all had gone off hunting and fishing with their canoes and temporary shelters.

The cache was made of logs, in a place not likely to be noticed: on top certain curious racks were lying. These, Choquette said, the Indians use for making sugar.

When we were again on board, the steamer started for the Tacon River and reached its mouth in a few hours. The Tacons are so like the other Indians in everything that a separate notice is not necessary. The most of the tribe live up the Tacon, but have a small village at its mouth. We had here a pleasant example of a very old Indian, blind and feeble with age, being tenderly cared for by his children or grandchildren. Choquette says this kindness is not usual among these Indians.

We next pass the Sumdums. Just after noon we began to encounter icebergs, very blue, some apparently as large as the ship. Several remarkable glaciers were working their slow way between the hills toward the strait. One glacier near the Sumdums was immense, extending from the top of a mountain 2,500 feet high to the foot; 200 to 300 yards broad and narrowing near the base. The Sumdums live near it. The young chief, Foustchou, met our boat at a halfway island. He was pleased that I got into his canoe and returned to the steamer, beating the steamer's boat. After this interview he asked for a "paper" for himself and the old chief Harteshawk, who was left at the village. I gave him one, Choquette reading its contents to him—in substance that I had met him, putting in a strong word against the liquor trade with his people, and some other sentiment desirable to leave with them. This was done with each chief. They esteem these "papers" highly, and I think, when they know the contents, they are influenced constantly by them.

Perhaps two hours before the sun touched the horizon June 17 we found ourselves in Prince Frederick Sound. It may be 20 miles wide; shores irregular; calm and smooth as a mill-pond; mountains rising in the distance, of different shapes like ghosts. Glaciers, in the dimness and evening light, looked like the mists and foam of Niagara. The islands and nearer shores were as clearly defined below the water as above. The steamer moved noiselessly toward Prevontet Island, whose distance was four times what it seemed. The whole scene was indescribably grand and beautiful. Captain Hays thought of the centennial aniversary of Bunker Hill, loaded his only cannon stoutly, and fired, dipping his flag. The echo was remarkably loud and prolonged.

At 10 p. m. we passed to our left into a snug little bay named Saganaw. The Cakes, who live near at hand, had undertaken to revenge themselves for the killing of some of their number by the sad mistake of the officers of an armed vessel visiting the bay. The "avengers" were demanded of the tribe, and, not being delivered, a gunboat was sent and their village destroyed. Either from timidity or hostility these Cakes had kept aloof from our people ever since. Such was the story told me by the interpreter. As soon as we were at anchor a Sitka Indian and child appeared in a canoe. By him I sent for the chief. He soon appeared and came on board the steamer. He explained why he did not visit Major Campbell. He was warned against it by a Sitka woman; feared we were against him still, and that he would not be kindly treated. The next time he visited Sitka he would surely report himself to the commanding officer. This chief, a young man, was well dressed, and behaved with dignity and showed good sense, and I believe had good intentions. The Cakes, such as we saw, appeared well; were pretty well clad and fed. I have not given the numbers of the different tribes, having no means of verifying those already on record. I have assumed their correctness. Some of the villages did not seem to have nearly as many as when the record was made.

FORT TOUGASS.

During the night we returned to Koutznous and left Major Campbell, the little steamer *Rose* meeting us to take him back to Sitka. We now turned homeward, touching at Shakan and Wrangell. At Fort Tougass it was not safe to anchor in the narrow stream, so we moved past slowly, that I might see the situation. The Indians communicated with us by canoes. A small tribe, not more than 130, lived here, near the beach. The chief's name was Yah-Shute. A custom-house officer lived at the old fort.

CONCERNING PORTIONS OF ALASKA NOT VISITED—EXTRACTS FROM MAJOR CAMPBELL'S REPORTS—FIREARMS, LIQUOR, ETC.

Before closing my report I will present certain complaints and reports that have reached me, where there appears to have been improper administration or a "violation of law." Major Campbell has frequently reported that, through the "Alaska Commercial Company," arms of the modern type are being distributed to the Indians. He says, in report of July 17, just received:

With what are known as Hudson Bay muskets the Indians are comparatively harmless. * * * It will be a very different thing, however, if they succeed in arming themselves with modern arms of precision and power. They are much more intelligent than the Indians of the plains; good marksmen, and throughout the coast are united by a class or caste of warriors called Koch-won-tons. This will enable them to concentrate in vast numbers.

After speaking of President Johnson's countermanding his executive order of August 2, 1868, by another of February 20, 1869, he continues:

The result is that arms and ammunition are shipped to Kadiak and Unalaska, of any kind and in any quantity, and from there distributed among the various trading posts of the Alaska Commercial Company, to be disposed of as they see fit.

I approve Maj. J. B. Campbell's suggestion, that if not practicable or expedient to compel the arms to be landed at Sitka, that the parties be required to apply for permission to ship through him or some other superior military authority. Other communications go to show that the breech-loading arms have reached even the Sitka Indians from the sources named.

REPORTS OF A CAPTAIN—THE MEASLES—LIQUOR MANUFACTURED—ARMS SOLD.

Major Campbell, in a letter of July 10, says:

A schooner arrived here the 1st of the month from Kadiak. From the captain, who is a very well-known and intelligent man, named Howard, and from Mr. Sherman, ex-deputy collector at St. Paul, Kadiak, I learned that the measles had been very badly epidemic there; 515 natives and creoles died of the disease last winter. They tell me a liquor called "quoss," made of hops, potatoes, sugar, and flour, is very extensively made in that locality. It is said to be very intoxicating. * * * Mr. Sherman tells me that $250,000 worth of furs (valuation there) are annually shipped from Kadiak, which is the fur depot for the coast, from Sea Otter Rocks and Onja Island to Neutchuck. He tells me he knew extensive distilling carried on at Ilyanna and at St. Nicholas; and that all whalers carry liquors to trade to the natives. He also says a man named Redfield runs a bark from San Francisco to Petropuluski, on the Asiatic side of Bering Sea, in conjunction with a man in San Francisco, that carries liquor almost exclusively. They clear for the Asiatic port, and then run across to this side with the liquor. He tells me that the ships of the Alaska Commercial Company clear direct for Unalaska and St. Paul Island; that vast quantities of superior arms of all kinds are shipped in their vessels, bonded only not to land on the fur-seal islands of St. Paul and St. George; that they are landed at Unalaska, and thence distributed throughout Upper Alaska by means of the company's agencies and ports. The two members of the Icelandic commission that remained at Kadiak to observe the winter climate were passengers on the steamer for San Francisco. They told me that the country suited their people better than any other part of America they had seen; said Kadiak was a fine cattle-raising or sheep country; that herd grass or timothy grows there luxuriantly, and is indigenous. * * * I concluded, from my conversation with them and others on the schooner, that these people have been discouraged to the full extent of the fur company's ability.

Major Campbell urges that immigration thither be facilitated, saying:

Alaska will long be a source of trouble and expense to the General Government until a sufficient number of industrious and honest people become inhabitants to enable them to form a government and take a permanent interest in the good order and welfare of society.

COMPLAINTS AGAINST THE ALASKA FUR COMPANY.

A citizen of long standing on this coast writes me:

The fur company who have leased the seal business from the United States Government make millions of profit; and that their operations are concealed as much as possible; that vastly greater numbers are killed annually, more than their agreement allows, and that large amounts of hush money are paid to keep the matter quiet.

In addition to this private letter and official report I had, while in Alaska, a pamphlet put into my hands entitled "A history of the wrongs of Alaska." Deeming the subject of such great importance as to need a thorough investigation of the proper authorities, and that even complaints might become of official cognizance, I attach a copy to this report. Of course, I have not the means of judging of the truth or falsity of most of the statements therein contained; but

do believe it to be a mistake and a dangerous precedent on the part of our Government to give into the hands of any company, however benevolent in its intentions, so vast a monopoly. The subject comes to me directly in the performance of my military duty in the execution of laws and instructions concerning ardent spirits, the sale of arms to Indians, and other police measures.

After leaving Fort Tougass, the steamer anchored, about 10 a. m. (Sunday, June 20), in the vicinity of Fort Simpson, British Columbia. All on board had the opportunity of going on shore and attending the service held with the Indians by the Rev. Mr. Crosby. The Indians here speak a different language, but are in other respects like those we had visited in complexion, size, manner of building houses, and nature of subsistence. The noticeable contrast between these Indians—men, women, and children—and the others, was the cleanliness and order everywhere apparent. The whole population flocked to church, neatly dressed, and engaged in the services almost with unanimity.

The marriage relation is respected, fighting and drunkenness of rare occurrence, and all in consequence of simple and faithful teaching by the missionary here and the missionary who has reached them indirectly from Mitlicatah, which is located 18 miles south.

As the military authority is now held responsible for Indian affairs in Alaska, I have thought it best to make a full statement of my observations, with the hope that speedy legislation may be had to give to our Indians there, as well as others, already said to be in advance of others in point of intelligence, certainly as good opportunities in the way of government and instruction as those have in contiguous British territory. We reached the dock at Portland Friday evening, June 25.

REPORT OF IVAN PETROF ON THE POPULATION, RESOURCES, ETC., OF ALASKA.

POPULATION, RESOURCES, ETC., OF ALASKA.

[From United States Census Report of 1880.]

By IVAN PETROF.

INTRODUCTION.

For the purposes of this report it has been found most convenient to divide Alaska into six geographical divisions, as follows:

1. The Arctic division, containing 125,245 square miles, and comprising all that portion of the North American continent between the one hundred and forty-first meridian in the east and Cape Prince of Wales, or Bering Strait in the west, the Arctic Ocean in the north, and having for its southern boundary a line indicating the watershed between the Yukon River system and the streams emptying into the Arctic and impinging upon the coast of Bering Sea just north of Port Clarence.

2. The Yukon division, containing 176,715 square miles, and comprising the valley of the Yukon River as far as it lies within our boundaries and its tributaries from the north and south. This division is bounded by the Arctic division in the north, the one hundred and forty-first meridian in the east, and Bering Sea in the west. The southern boundary lies along a line indicating the watershed between the Yukon and the Kuskokwim, Sushitna, and Copper rivers, and runs from the above-mentioned meridian in the east to the coast of Bering Sea, in the vicinity of Hazen Bay, in the west. The island of St. Lawrence, in Bering Sea, is included in this division.

3. The Kuskokwim division, containing 114,975 square miles, bounded on the north by the Yukon division, and comprising the valleys of the Kuskokwim, the Togiak, and the Nushagak rivers, and the intervening system of lakes. The eastern boundary of this division is a line running along the main Alaskan Range of mountains from the divide between the Kuskokwim and Tanana rivers down to the low, narrow isthmus dividing Moller Bay from Zakharof Bay, on the Aliaska Peninsula. Bering Sea washes the whole west and south coasts of this division, which also includes Nunivak Island.

4. The Aleutian division, containing 14,610 square miles, and comprising the Alaska Peninsula westward of the isthmus between Moller and Zakharof bays and the whole chain of islands from the Shumagin group in the east to Attoo in the west, including also the Pribilof or Fur Seal islands.

5. The Kadiak division, containing 70,884 square miles, and comprising the south coast of the Aliaska Peninsula down to Zakharof Bay, with the adjacent islands, the Kadiak group of islands, the islands and coasts of Cook Inlet, the Kenai Peninsula, and Prince William Sound, with the rivers running into them. The main Alaskan Range bounds this division in the north and west. Its eastern limit is the one hundred and forty-first meridian, which intersects the coast line in the vicinity of Mount St. Elias, while the south shores of the division are washed by that section of the North Pacific named the Gulf of Alaska.

6. The southeastern division, containing 28,980 square miles, and comprising the coast from Mount St. Elias in the north to Portland Canal, in latitude 54° 40′, in the south, together with the islands of the Alexander Archipelago between Cross Sound and Cape Fox. The eastern

boundary of this division is the rather indefinite line established by the Anglo-Russian and Russian-American treaties of 1824 and 1825, respectively, following the summits of a chain of mountains supposed to run parallel with the coast at a distance not greater than three marine leagues from the sea between the head of Portland Canal and Mount St. Elias.

Geographical Divisions.

THE ARCTIC DIVISION.

Situated, as it is, almost entirely above the Arctic Circle, the Arctic division is known to us only from observations made on the seacoast. The vast interior, consisting probably of frozen moors and low ranges of hills, intersected here and there by shallow, sluggish streams, remains entirely unknown. We may presume that the reindeer find a refuge here from the constant persecution of the coast people or Arctic Eskimo on one side and of the Yukon River people on the other. Statements have been made by natives of the latter region to the effect that routes of travel are in existence connecting the river settlements with those on the Arctic, but nothing definite can be ascertained concerning them with the exception of the general and well-established route of traffic between the Koyukuk, a northern tributary of the Yukon, and the settlements on Kotzebue Sound; and even this has never been traversed by a white man. Lieutenant Zagoskin, of the Russian navy, made the attempt nearly forty years ago, but failed, reaching merely the head waters of the Selawik River, and since his time the only reliable information concerning this route rests upon the statements of a few intelligent half-breed traders.

The only rivers known to emerge from this inland waste are the Colville River, emptying its waters into the Arctic Ocean about half way between Point Barrow and our eastern boundary; the Kok River, the mouth of which is located perhaps 50 miles to the eastward of Icy Cape, near Wainright Inlet; the Inland River, or Noatak, falling into the northern part of Kotzebue Sound, and the Kooak, the Selawik, and the Buckland rivers, debouching into the same estuary.

The natives on the coast and whalers report the existence of settlements farther up on all these rivers, with the exception of the Colville River, whose head waters no white man has ever visited. The coast settlements between Cape Prince of Wales and Point Barrow are visited annually by many schooners and ships engaged in whaling, hunting, and trading, and the inhabitants are better accustomed to white men than the natives of any other regions in Alaska. Being possessed of great commercial genius and energy, they do not confine themselves to this intercourse with the Caucasian race, but carry on an extensive traffic with the natives of the Arctic coasts of Alaska and of Asia, meeting the latter on the common trading grounds of Bering Strait and the Diomede Islands. In the intervals between this traffic the natives living in the villages of Cape Prince of Wales and the Diomedes are active hunters and whalers, and when the icy barriers of winter close up their deep-sea hunting grounds they confine themselves to the inlets and streams, hunting seal, reindeer, and polar bears, and trapping the Arctic fox, whose snowy coat is rising in value from year to year.

From Point Hope to the eastward we find a series of villages, inhabited principally by reindeer hunters, who kill the seal during the summer season only for the sake of its luscious blubber and meat. The skins of the reindeer are made up into garments, and in that shape find ready sale among the whalers and the neighboring Eskimo tribes to the westward and southward. Along that dreary, low, ice-bound strip of coast between Point Hope and Point Barrow the scattered Innuit settlements also depend upon reindeer, seal, and walrus for their subsistence, each of these animals being hunted in its proper season.

From Point Barrow eastward to the boundary the settlements are few and widely scattered, and the navigators who have made their way through the dangerous channel between the ice and the shore have found these people quite expert whalers, harpooning the huge cetaceans on their way to and from their breeding ground at the mouth of the Mackenzie River.

The only mineral of any value known to exist on the coast of this immense Arctic division is coal, located in several easily accessible veins in the vicinity of Cape Lisburne, reported long ago by Kellett and other English explorers, but more definitely located and utilized by Captain

Hooper, of the United States revenue marine, in July, 1880. This discovery is of importance to the cruisers of the revenue marine and to the steam whalers visiting the Arctic from San Francisco, but will not probably open up a field for private enterprise in that direction. The only attraction for the daring navigators who pay annual visits to this coast consists in the natural resources of furs, oil, and walrus ivory; but under existing circumstances, and as long as our portion of the Arctic is comparatively unprotected against encroachments of unscrupulous contraband traders, there is danger of an utter exhaustion of furs and of walrus ivory at no very distant period.

The whaling industry may be expected to decline gradually here, as it has done in other sections of the globe. The danger indicated lies in the fact that the trading vessels coming to this region, chiefly from the Sandwich Islands, have carried such quantities of alcoholic liquor that the natives have acquired a craving for the same that can no longer be subdued, and this causes them to look for no other equivalent for their furs, oil, and ivory than the means of intoxication. At the same time they have become utterly reckless in their pursuit of fur-bearing and other animals, thinking only of satisfying their desire for the present, without the slightest thought of the future; and if this state of affairs be continued the extermination of the people, consequent upon the exhaustion of their means of subsistence, can only be a question of time. The immoderate consumption of alcohol brings with it disease and war. Against the former all remedies are out of reach, and, far from using his influence in suppressing strife arising through his fault alone, the freebooter supplies the unfortunate Eskimo liberally with breech-loading arms and ammunition, thus making their wars more bloody and destructive.

No trace or shadow of Christianity and its teachings has found its way to these desolate regions, the dark night of shamanism, or sorcery, still hanging over the human mind. These people share with their Eastern kin a general belief in evil spirits and powers, against whom the shaman alone can afford protection by sacrifices and incantations. All sickness is ascribed to the direct action of evil spirits, and is treated accordingly. There can be no doubt of the sincere belief of many of these sorcerers in their own performances, but in every instance they make the exercise of their power, be it real or imaginary, a source of revenue and of influence among their people.

No philanthropic missionary has ever found his way to this icy coast, and unless some modern Hans Egede makes his appearance among them in the near future there will be no soil left in which to plant Christian seed.

It must be evident to any careful observer that there is no foundation in this division of Alaska upon which to build hopes for future development. As it is now it may remain for a few years at the most, but improvement seems now beyond the range of possibility.

As a foothold for arctic explorers and for the scientific phalanx now steadily advancing toward the pole this region may yet be utilized, especially since a beginning has been made in this direction by the establishment of a meteorological station at Point Barrow under the auspices of the United States Government.

A brief account of the animal life of this region, based upon our latest authority—a naturalist accompanying the steamer *Thomas Corwin* on her arctic cruise—is partially embodied in the report of Capt. C. L. Hooper.

Whales are found in all sections of the arctic, and enter as soon as the ice breaks up and remain until compelled to leave by the closing up again of the sea. They are always found in the immediate vicinity of ice. The Eskimos assert that these marine mammals are most numerous after the departure of the whaling fleet in the autumn. The variety called the "bow-head" by hunters is the most common; the California gray and the finback whale are much more rare; in fact, they are seen only occasionally here and there. The white whale, or grampus (beluga), although confined to no particular section of the arctic, is more numerous in the vicinity of the rivers, and especially those emptying into Kotzebue Sound, the female grampus with its young often ascending the rivers as far as tide water reaches, feeding upon small fish, and they may be observed on almost any clear day or night, the mother coming first, puffing and snorting, with an occasional display of her milk-white back as she guides her calf to the feeding ground.

The walrus, like the whale, is found all over these waters in the vicinity of ice. These animals enter the Arctic in the spring as soon as the ice disappears from Bering Strait, and remain until driven away again by the ice, when they retire into Bering Sea. They collect in large numbers on the ice in groups or herds, called "pods" by the hunters, and hundreds of them may be seen drifting through the strait on ice floes during the month of June. The walrus seem to prefer detached bodies of ice to the main pack, because they can better watch thus for the approach of their natural enemy, the polar bear.

Seals in three or four varieties seem to be ubiquitous in these waters, the leopard seal being the rarest among them.

Polar bears are met with everywhere, and are generally found on the ice or in its immediate vicinity, but instances have been recorded of their being seen at sea, 50 or 60 miles away from any land or fixed ice. They grow to an enormous size, often weighing from 1,000 to 2,000 pounds. The skin of this animal is only valuable late in autumn and during the winter; but only a few are secured during that season of the year. They fight the walrus constantly, and generally successfully, and are ever ready to turn upon the man who happens to inflict a wound not immediately mortal.

Reindeer are said to be most numerous in that section of the coast lying between Point Barrow and Point Belcher, but they often change their habitation, at times migrating in immense numbers to regions hundreds of miles away, where their human pursuers do not dare to follow. This habit of migration alone has thus far preserved the reindeer from extirpation by the ardent hunter.

Moose do not appear anywhere on the Arctic shore, but natives report them as numerous in the far interior. Mountain sheep are also said to be plentiful on the lines of hills remote from the seashore, but only a few horns of the animal, shaped into spoons and other utensils, can be found on the seacoast; and if these animals are killed in this region at all, it is done by natives located in the interior and not yet visited by white men.

Muskrats and squirrels are numerous all over the coast. Their skins are offered for sale in large quantities, as the Eskimo does not make use of them for his wearing apparel, but prefers the heavier coats of the reindeer and seal for that purpose.

Foxes are plentiful, especially the white or arctic variety, and their skins are easily secured and meet with ready sale. In the depth of winter, when these foxes experience great difficulty in obtaining necessary food, they fearlessly approach the dwellings of men and help themselves to whatever comes within their reach, no matter what the material so long as it fills the stomach.

Aquatic birds are very numerous along the coasts and cliffs, and myriads of geese and ducks breed and rear their young on the vast swampy tundras as soon as the snow disappears and the plains are covered with the enlivening colors of an arctic summer vegetation.

The only fish of any value found on the Arctic coast of Alaska are the salmon. They are quite plentiful and of fine flavor, though generally smaller than those caught farther south, and the Eskimo located in the vicinity of rivers cure large quantities of them by smoking and drying for winter use. The presence of vast numbers of seals living on fish alone indicates most certainly the presence of other smaller varieties of fish, but the natives appear to catch no other kind, and even the whalers can give us no information upon this point.

It is impossible to obtain statistics of the provisions, manufactured goods, arms, and ammunition shipped to the Arctic coast of Alaska and disposed of among the natives there, chiefly because the bulk of this trade has fallen into the hands of illegitimate traders, who clear from American ports for the coast of Siberia, then touch at the Sandwich Islands to lay in a supply of spirituous liquors, and finally cruise along the Alaskan coast, purchasing all the furs, fossils, and walrus ivory in the hands of the Arctic Innuits with rum, breech-loading arms, and ammunition. This traffic, though quite extensive in volume, lies at present altogether without the pale of official investigation, and only the continuous presence of one or two vessels of the revenue marine in these waters could reduce the trade of the arctic division to a legitimate basis.

During the summer of 1880 an enumeration of the Eskimo inhabiting this division was made

by Capt. E. E. Smith, then ice pilot of the revenue cutter *Thomas Corwin*. In nearly every instance this enumeration was made by actual count, and based upon this authority we present the following list of settlements and their population:

ARCTIC DIVISION.

Settlements.	Location.	Eskimo.
Kingigamute	Cape Prince of Wales, Bering Strait	400
Inalit	East Diomede Island, Bering Strait	40
Village opposite on mainland	Arctic Ocean	18
Ta-apkuk	Cape Espenburg, Kotzebue Sound	42
Kugalukmute	Kotzebue Sound	12
Kongigamute	Buckland River, Kotzebue Sound	90
Selawigamute	Selawik Lake, Kotzebue Sound	100
Kikiktagamute	Kotzebue Sound	200
Sheshalegamute	do	100
Tikizat	Arctic Ocean	75
An-iyakh	do	25
Cape Sepping	do	50
Ip-Not	do	40
Tikirak	do	276
Cape Dyer	do	15
Cape Lisburne	do	13
Point Lay	do	30
Otok-kok	Icy Cape, Arctic Ocean	50
Kolumatourok	Arctic Ocean	45
Noona-agamute	do	74
Ootkaiowik	do	55
Pinoshuragin	do	29
Ootiwakh	do	225
Refuge Inlet	do	40
Kokmullit	Point Barrow, Arctic Ocean	200
Colville River	Arctic Ocean	50
Total		3,094
IN THE INTERIOR.		
Koo-agamute villages	Kooak River	250
Noatagamute village	Inland River	400
Killaïmute villages	Kok River	150

The superficial area of the Arctic division of Alaska embraces 125,245 square miles, which, with a total population of 3,094, would give us the proportion of one native inhabitant to 40½ square miles, without a single white man or woman. Fully nine-tenths of this vast area lies north of the Arctic circle.

THE YUKON DIVISION.

The second geographical division in the order of discussion is the largest in Alaska, comprising as it does the valley of the largest river on the North American continent, so far as this mighty stream flows within our boundaries. Along the eastern portion of this division its northern and southern boundaries are clearly defined by nearly parallel chains of mountains, the southernmost of which greatly exceeds in height the northern. Farther to the westward, where the Kuskokwim River takes its rise in the region unknown to white men, the branch of the main Alaskan chain of mountains, forming the watershed between the latter river and the Yukon, gradually decreases in height, until nothing remains but isolated groups of hills only a few hundred feet above the level tundras, stretching away to the westward, until they finally merge with the shallow waters of Bering Sea. In the vicinity of the portage route between these two large rivers, where they approach to within 30 or 40 miles of each other, the country is so low that a canal of less than half a mile in length would allow the waters of two vast river systems to mingle with each other.

The life artery of all this vast division is, of course, the river from which it takes its name, which has served as the highway of nations and tribes for many centuries, long before the white

man, with his improved means of transportation, accomplished the feat, marvelous in their eyes, of traversing in one brief season the distance from its deltoid mouth to the Hudson Bay fort at the junction of the Yukon and the Porcupine rivers.

The North American Indians of Athabaskan stock inhabiting the banks of the Yukon and its tributaries east of the Anvik and Chageluk rivers had but a faint conception of the sea to the westward, and perhaps a majority of the tribes were ignorant of its existence. On the other hand, the hardy Eskimo, living along the coast of Norton Sound, the lower Yukon River, and the Kuskokwim delta, had advanced at an early day across the divide between the great river and the sea, following up the course of the Oonalakleet River, striking the Yukon 40 or 50 miles south of Nulato. They settled the right bank of this river from there to its mouth and both banks west of the Chageluk, but were not allowed to hold peaceable possession, the Indians rallying from all directions and driving the intruders back far down the river, where the last traces of rolling hills are lost in the swampy tundras. From time to time the Eskimo advanced again, and traditional tales of bloody battles and years of war between the tribes have come down to us, but through all the varying fortunes of the contest the Eskimo succeeded in keeping the Indians from reaching the sea.

At the present time the Indian or "Ingalit" tribes hold full sway over the river down to Paimute village, situated below the junction of the Anvik River with the Yukon, and no Innuit (or Eskimo) ascends the river beyond this point unaccompanied by white men, while no Ingalit descends without the same protection.

During the brief summer of this region the whole population flock to the river banks, attracted by myriads of salmon crowding the waters in their annual pilgrimage of reproduction up this mighty stream. At that time both banks are lined with summer villages and camps of fishermen, who build their basket traps far out into the eddies and bends of the stream and lay up their store of dried fish or "yukala" for the long Arctic winter. This annual congregation along the river banks completely drains of human life the valleys and plains stretching away to the northward and southward, and many of the lake regions in the western plains.

The traveler passing up or down the river during this busy season would form an entirely erroneous estimate of the density of the population if he should draw the conclusion that the vast forests covering the mountains and slopes on either side are inhabited by other tribes. Were he to make a brief excursion into the almost impenetrable forests and over the hills and mountains he would quickly perceive that along the river alone exist the conditions necessary to sustain life throughout the year. The small rivulets of the interior and the vast swampy plains covered with snow for seven or eight months of the year are only visited by the trapper and hunter when the skins of the marten, mink, and muskrat are in their prime. Where the mountains are higher, along the upper courses of the Yukon and the Tanana, game is more abundant and the inhabitants are less dependent upon the river and its fish.

In the past the staple food during the winter was the meat of the reindeer, which animal was then abundant throughout the whole Yukon section, but the first introduction of breech-loading arms among these native tribes caused an indiscriminate slaughter and the almost total disappearance of this animal from the immediate vicinity of the river. At that time the moose was found only high up the river, and the mountain sheep was rarely even heard of. At present the reindeer is again gradually making its appearance here and there, but the moose, though hunted constantly and energetically, seems to be increasing in numbers, and has advanced down the river and spread all over the delta between the Yukon and the Kuskokwim.

American enterprise has already taken hold of the fur trade of this region to its full extent, and rival firms have lined the banks of the Yukon with trading stores from Bering Sea to the eastern boundary.

The shrill whistle of the steamboat is welcomed annually by thousands along the river banks at the breaking up of the ice, and it is echoed by the hills and mountains of the far interior, where the Hudson Bay Company once reigned supreme.

Foxes of all shades, from the highly prized silver-grey and black to the fiery red and the snow-white fox of the Arctic, furnish the staple fur of the Yukon region. The martens and the

land otters come next in numbers, and the black and the brown bear constitute but an insignificant item of trade, while the mink of the tundras and the river delta, though exceedingly numerous, are next to valueless. The moose and deer skins are nearly all consumed by the natives themselves for clothing and bedding.

The total value of furs shipped from this vast region to the American and European markets does not probably exceed $75,000 per annum, and the profits of this traffic are divided by two incorporated California companies, with fifteen or twenty trading stations along the river. The fiercest competition has caused high prices of furs, and it frequently occurs that one or the other of the firms carries on its operations for a season at a loss.

No mineral deposits in paying quantities have yet been discovered as far as the Yukon flows within our boundaries. Prospectors have been at work for many years along its upper course, but only on the Tanana have traces of gold been found in quantity sufficient to pay a laborer's wages during the brief summer season.

Rich as the river is in fish and the forest in game, the supply does not seem to be equal to the demands of the native population. There is an annually recurring period of famine during the later months of winter and spring, and nearly all the money received from the traders is expended for flour, tea, and sugar, the shipment of these articles to the Yukon region increasing in quantity every year. Happily, nature affords better protection to fur-bearing animals than to game, and there does not appear to exist any danger of exterminating the former.

Much has been said and written by travelers who passed during a brief arctic summer through the Yukon Valley with its high temperature, rank vegetation, and brilliant flora (and by others who never saw the river) of the great agricultural region here awaiting development in the near future. The real facts do not warrant any such expectation. The whole valley of the Yukon lies within a few degrees of the arctic circle; the soil, where it is level, is always swampy, and even the slopes of hills and mountains are never drained of their superabundant moisture. The heat of summer has no effect beyond an astonishingly rapid growth of native grasses and weeds and the bringing into life of dense clouds of mosquitoes all over the country.

There is no doubt that a few vegetables will come to maturity here during the summer, and traders, tired of an uninterrupted diet of animal food, have made many experiments in this line. In no single instance has there been a continued success in these ventures, heavy frosts at the end of July having, as it were, frequently nipped in the bud the growing hopes of the traders of reaping a scanty harvest of potatoes, turnips, and radishes. Even if the interior valleys of the Yukon were as well adapted to the production of cereals as are the Saskatchewan and the Red River valleys, which they are not, there would still be the difficulty of finding a market for produce from such an inaccessible region. Their only artery of trade would be, of course, the Yukon, and that is not open to navigation until the month of July, closing again at the end of September. No seagoing craft can enter the river at all, and transshipments of cargoes would be necessitated at some point on the coast away from its mouth.

For hundreds of miles from the sea the Yukon River flows through low, level tundras, or mossy morasses, resting upon a foundation of clay. The shifting current of the river eats away the shores on either side with astonishing rapidity; the dull thud of caving banks is constantly heard by the traveler, and whole reaches change their aspect entirely within a single season. Stepping upon the shore, the explorer must jump from hummock to hummock or wade around from knee to waist deep. In many places the ice never disappears within a few inches of the surface, being protected from the rays of the sun by a nonconductive carpet of sphagnum. Wherever there is a slight elevation of ground in all this watery waste the wretched natives have located their villages, the dwellings consisting of excavations in the ground roofed over with mounds of sods. Here they fish during the summer and hunt the mink and the moose in the winter. Millions of geese and ducks visit this region in the breeding season, but comparatively few of them fall victims to the Innuit hunter, who is but an indifferent shot, and powder is dear. The capture of a large species of seal called "maklak" is considered a great windfall by the hunter, and if three or four of them succeed in slaying a snow-white beluga, or grampus, the village at once becomes the scene of festivity and rejoicing. Milk and honey can not be said to flow at

any time in this region, but oil does occasionally, lending a decided "luster" to the life of the Innuit and all his surroundings.

The observations of the temperature in the Yukon division have not been extensive, and of only two points in the interior have we a series of temperature readings. Nulato is a trading station and Indian village, situated at about the central point of the Yukon River Valley. Here the mean annual temperature, according to the observations of the Western Union Telegraph exploring parties, appears to be but 6° 8′ above zero. It must be remarked, however, that the warmest months of the year are not included in this series of thermometrical readings. From Fort Yukon, at the junction of the Yukon and the Porcupine rivers, we have a complete set of readings for a whole year, from which we deduce an average for the summer temperature of 56°, and for the winter of −23°, with an annual mean of +16° 84′.

We insert the following table, as published by the United States Coast and Geodetic Survey in the Pacific Coast Pilot of 1879:

Temperature observations at Nulato, Alaska.

[Degrees.]

Months.	1866-67.						
	9 a. m.	1 p. m.	8 p. m.	Mean.	Maximum.	Minimum.	Range.
January	−18.5	−16.3	−18.3	−17.7	+15	−49	64
February	−15.5	−10.4	−12.9	−12.9	25	−51	76
March	+11.5	+19.6	+13.5	+14.9	38	−40	78
April	19.2	+34.4	25.9	26.5	49	.....	49
May	40.9	56.1	42.3	46.4	74	+22	52
June	.....	.....	.....	.....	.....	.....	.....
December	−11.2	− 8.0	−10.2	− 9.8	22	−56	78
Whole period	+ 3.4	+10.9	+ 5.8	+ 6.8	+74	−56	130

Temperature observations at Fort Yukon, Yukon River, Alaska.

[Degrees.]

Month.	Mean.	Max.	Min.	Range.
1869.				
August	56.3	77	58	19

Months.	Daily mean.	Mean at 1 p. m.	Monthly max.
1870.			
January	−26.85	27.58	17
February	−26.44	−23.55	10
March	−11.16	− 0.94	28
April	12.66	19.43	52
May	41.24	48.81	70
June	53.49	62.00	.....
July	65.75	74.84	76
August	59.90	70.94	86
September	38.66	52.73	69
October	21.60	9.49	50
November	− 8.28	− 5.40	28
December	−18.43	− 5.39	22
Spring	14.60	22.71	70
Summer	56.73	69.28	86
Autumn	17.37	26.03	69
Winter	−23.80	−22.70	22
Year	14.58	23.89	86

From Mr. E. W. Nelson's report to the Chief Signal Officer on the meteorology of St. Michael and vicinity I extract the following:

During the past four years the first mush ice has begun to form in the bays from the 15th to the 18th of October, and the bays have been frozen over so as to bear a man from the 25th to the 28th of October, with the exception of

the year 1878, when a strong wind took the ice out, and it did not freeze again until the 10th of November. Up to the 15th of October vessels could enter here without danger of meeting ice. In the spring much more uncertainty exists, as to a great extent the date of open water depends upon what the prevailing winds may be. Long-continued north winds, following a severe winter, as in 1880, may keep the ice barrier in until the 20th of June, and it has even remained until nearly the 1st of July; but these late dates are exceptional. As a rule, the ice will be thoroughly broken up and a strong vessel may enter Norton Sound through the ice by the 10th of June (in 1875 a vessel reached this port May 25, but it was in the hands of an experienced ice pilot). Vessels have reached here for the past four years between the 20th of June and the 1st of July; these may be called safe dates for any vessel except in an unusual season as during a large part of June fine weather prevails. There is usually but little risk in entering the ice at that season.

TEMPERATURE.

The range of the thermometer during the past seven years has been from 76° to —55° or 131°; though for the past four years the average yearly variation has been but 71.2° The maximum variation of the past four years was in 1877 and 1878, when the highest extremes were respectively 75° and —50°, and 73° and —52°, amounting to a range of 125°. The smallest range in 1879 was 100°, from 68° to —32°; the average of the mean monthly temperature, made up from the daily average of three observations for the years 1877, 1878, 1879, and 1880 is as follows:

	Degrees.		Degrees.
January	— 5.0	July	53.1
February	— 6.5	August	52.1
March	9.5	September	43.3
April	22.1	October	28.0
May	32.8	November	8.3
June	45.2	December	8.9

The minimum averages for any single month are —23.7° for February, 1877, and —19.8° for January, 1880. The highest monthly means are 54.5° and 53.4° in July and August, 1877, respectively. The mean annual temperature for the four years is 25.5°. The highest mean for one year is 26.8°, in 1879, and the lowest 23.9°, in 1880. January and February rank as the two coldest months, and July and August are the warmest.

TIDES.

The ordinary tides are small and give a rise and fall of only about 2 or 3 feet, but the winds from either north or south produce a striking variation. A long-continued and heavy gale from the south raises the water of Norton Sound at least 10 feet above ordinary tide mark and overflows large stretches of the low coast to the southward. Some of the heaviest of these gales occur during the winter, and frequently the sea, covered with heavy ice, sweeps over the low coast lands between the Yukon and the Kuskokwim rivers for miles, and whole native villages have been thus destroyed with many of their inhabitants within the last few years. As the tide falls the ice, 3 or 4 feet thick, is left stranded on the lowland. A light south wind is sufficient to raise the tide from a few inches to several feet above the ordinary extent. North winds affect the tides in proportion to their strength exactly in the inverse ratio of the south winds. When long-continued and strong gales from this direction occur (most frequently in autumn) the shallow bays are laid bare, long reefs are exposed, and a general fall of the water of about 8 feet occurs. It is to the high tides and south winds of spring or early summer that this region is indebted for the driftwood which, emerging from the Yukon, is cast upon the beach, and furnishes the only fuel and building material here.

VEGETATION.

The whole coast in this part of the country is bare of any kind of timber, and a few patches of scraggy alder on sheltered southern hill slopes, with the arctic willows creeping over mossy ground, are almost the only bushes to be found. The ground is covered with a soft layer of decaying vegetable matter and mosses, which hold water like a sponge. In addition, a varied and hardy subarctic flora manages to thrive everywhere except on the northern slopes of the hilltops, where only lichens grow or total sterility prevails. As soon as the warm days begin the hardier plants start up and by the first of June shade the country with green in sunny spots, making a pleasant contrast to the gray and russet elsewhere; a few days later, and the southern hill slopes are thickly dotted with flowers.

GARDENING.

Repeated attempts to raise garden vegetables have been made, but with poor success, as turnips, radishes, and lettuce appear to be the only vegetables from which any adequate return may be expected, and even in these cases the trouble far exceeds the reward.

ATMOSPHERIC PHENOMENA.

For the four years preceding April 30, 1880, the average proportion of cloudiness during the year had been as follows:

Average number of totally cloudy days	182.2
Average number of partially cloudy and fair days	131.5
Average number of clear days	50.5

The average number of days during which rain or snow fell at St. Michael during the last four years was:

January	9.0	July	14.2
February	5.7	August	19.5
March	8.2	September	17.7
April	16.2	October	16.0
May	11.2	November	10.0
June	9.8	December	9.7

Or an annual average of 14.75 days on which rain or snow fell. The average annual precipitation equals 18.36 inches.

The number of days on which rain or snow fell appears very disproportionate, but this is readily explained by the character of the precipitation. In but a single instance during four years have I seen a hard downpour of rain, such as is common in lower latitudes, but either fine showers of short duration or long misty rains, which at times fall for a day or two, leaving scarcely a measurable quantity of moisture in the rain gauge, though every exposed object becomes saturated like a water-soaked sponge. The snow usually bears the same character and falls in fine amorphous flakes, rarely showing perfect crystalline forms and as rarely falling in large flakes.

ELECTRICAL PHENOMENA.

Thunder showers are said to be quite common in some parts of the Yukon River Valley during the summer, but in the vicinity of St. Michael flashes of lightning, accompanied by thunder, have been observed on two occasions during the four years. Probably the low temperature and the high relative humidity combine to lessen such displays here. During the coldest weather in winter, nearly always after a snow fall, the air is in a highly charged condition, and at such times a passing stroke upon any loose fur causes the hairs to stand up, so fully charged that by presenting the finger to a single hair tip the snap of a spark may be heard 3 feet away; and in the dark a train of sparks follows the hand in stroking any fur.

MIRAGES.

During the fine weather, from the last of February until the latter part of July, most of the clear days are accompanied by more or less mirage, which is generally strongest on cold, clear days in March and in fine, warm days in May and June. The coast hills and capes, 30 to 75 miles away, are lifted up and contorted into the most fantastic shapes, which constantly assume new forms with protean rapidity, until the whole landscape appears but a form of air, the least change in one's altitude producing a disproportionate change in the scene. I have seen a tall, pinnacled hill, apparently hundreds of feet high, melt away and totally disappear under the horizon by descending about 15 feet from my first point of view, and the changes in outline are equally abrupt and surprising. During the entire year upon pleasant days the air is constantly vibrating more or less appreciably to the eye, but during the clear, intensely cold days in the latter part of winter these vibrations are so energetic that everything on or nea the surface of the ground becomes at a distance of about 2 miles blended into an indistinct, tremulous blur.

CHANGE OF SEASON.

As in most other places under high latitudes, there is no long gradation from season to season, but instead we have two well-marked periods—a long winter of about seven months, extending from October until well into May, and five months of summer. The winter is by far the best, as there are long periods of beautifully clear days, which are welcomed in spite of the usually accompanying intense cold. The summer is rendered very disagreeable by a large number of cold, misty rains, and the low overhanging stratum, which appears to shut down all about like a leaden covering. As noted in the first part, no slush ice forms in the bays with the water at a temperature of 30.5°; and, in addition, the whole surface of the sea, if calm, appears covered with large oily-looking patches, which slowly increase in size, and as the temperature reaches 30° the slush begins to unite. In the oily-appearing spots the water, on close examination, has a milky shade, and is seen to be full of extremely fragile laminæ of ice floating with their edges vertical. These plates, when ground and broken, form the slush ice along the shore. Many of these plates are an inch or more in diameter, but are so fragile that a breath dissolves them. Ice forming in this way is always rough, but a rapid and extended fall of temperature directly after the oily spots appear sometimes throws a thin sheet of glassy ice over the sea for many miles in a single day.

MIGRATION OF BIRDS.

The earliest arrival in spring is generally a solitary goose or two. In the last days of April, and from then on until the 1st of June, birds continue to arrive, the main migration falling between the 15th and the 25th of May. The common barn swallow comes May 20; the waterfowl; geese, and ducks begin nesting on the last of May. The autumn migration of birds passing southward begins on the last of July, and only a few of the hardier waterfowl remain at the end of September.

FISH.

The arrival of fish depends largely upon the date of open water along the shore. Herring generally arrive from the 5th to the 20th of June. The delicious king salmon come from the 15th to the 25th of the month. and the inferior species of salmon in July and the month of August.

In 1868 Mr. William H. Dall made a report upon the agricultural resources of Alaska, which was published by the Commissioner of Agriculture. From this official document I make the following extract:

The character of the country in the vicinity of the Yukon River varies from rolling and somewhat rocky hills to broad and marshy plains, extending for miles on either side of the river. The underlying rocks in great part are Azoic, being conglomerate, syenite, and quartzite. The south shore of Norton Sound and portions of the Kadiak peninsula are basalt and lava. There is on the northeast shore of Norton Sound an abundance of sandstones and clay beds containing lignite. Sandstone is also abundant on the Yukon, alternating with the Azoic rocks. The superincumbent soil differs in different places. In some localities it is clayey, and in such situations is quite frequently covered with sphagnum, which always impoverishes the soil immediately beneath it. In others it is light and sandy, and over a large extent of country it is the richest alluvial, composed of very fine sand, mud, and vegetable matter, brought down by the river and forming deposits of indefinite depth. * * * The soil is usually frozen at a depth of 3 or 4 feet in ordinary situations. In colder ones it remains icy to within 18 inches of the surface. This layer of frozen soil is 6 or 8 feet thick; below that depth the soil is destitute of ice, except in very unusual situations.

The mean temperature of the Yukon region, as given by Mr. Dall with reference to the point of St. Michael, in latitude 63° 28′; the mission of the Greek Church on the Yukon River, in latitude 61° 47′; Nulato, on the Yukon River, in latitude 64° 40′, and Fort Yukon, on the same river, in latitude 67° 10′, is exhibited in the following table:

[Degrees.]

	St. Michael.	Greek Church mission.	Nulato.	Fort Yukon.
Mean for spring	+29.3	+19.62	+29.3	+14.22
Mean for summer	+53.0	+59.32	+60.0	+59.67
Mean for autumn	+26.3	+36.05	+36.0	+17.37
Mean for winter	+ 8.6	+ .95	−14.0	−23.80
Mean for year	+29.3	+26.48	+27.8	+16.92

The temperature as exhibited in the above table would not seem to afford much encouragement to the agricultural immigrant, even without reference to the existence of frozen soil throughout the year within a short distance of the surface as mentioned above.

Incomplete and unsatisfactory as our information is on this subject, the data given would appear to be conclusive as to the adaptability of the Yukon River Valley for agricultural pursuits. From various points on the river traders report a temperature of from 50° to 60° below zero, a common occurrence during the winter; and, though travelers in and residents of this region complain of oppressive heat during the summer, severe frosts frequently occur in the months of June and August, and one instance is recorded of a heavy frost at Nuklukayet on the 27th of July, which destroyed a promising vegetable garden planted there in the summer of 1879.

Two Roman Catholic missionaries, Bishop Charles Seghers, S. J., and Father Mondard, his assistant, passed the winter of 1877–78 in the central Yukon region. They suffered much from severe cold during the winter, and when at last the ice disappeared, and the snow melted away from forest and from tundra, the contrast between winter and summer was so great that the pious missionaries were filled with delight, and warming their bodies, chilled through the eight months of constant cold, in the genial rays of the sun of July, they grew enthusiastic over the warm climate of the Yukon and its "fertile valley" that might support millions of agriculturists. These good missionaries evidently had no experience in farming or husbandry, and had never attempted to sink a spade into the matted, elastic covering of the Yukon tundra. The plague of the Arctic, the mosquito, alone would drive any but the most energetic and desperate settlers from the country.

In the apparent absence of precious minerals in paying quantities we must base our hopes for the future of the Yukon region upon its furs and fish alone.

The dreary coast line of this division, washed by the shallow waters of Bering Sea, is inhabited by a hardy race of seal and walrus hunters, who have planted their villages at every

point where it is possible for a few families to eke out a living. A few points on this coast line, from Cape Prince of Wales to Cape Romanzof, require special mention. Port Clarence, just south of Cape Prince of Wales, offers fine harbor accommodations, and three or four Innuit villages are located here. Kings Island, called "Oukivok" by the natives, is a small, high island about 30 miles southeast from Diomede Islands. This island is about 700 feet in height, with almost perpendicular cliffs and deep water on all sides, is composed of basalt, is exceedingly rugged in outline, and is barren of tree or shrub. The most remarkable feature of the island is the village, composed of winter houses, about forty in number, excavated into the sides of the cliffs, and built on a steep declivity, which rises from the sea at an angle of about 45°. On small projections from the face of the cliff the inhabitants erect their summer houses, consisting of rude tents of walrus and seal hide. The natives of this arctic Gibraltar live almost entirely by walrus and seal hunting, the skins of these animals being manufactured into roofs of houses, coverings for their kaiaks, clothing, straps, lines, and other articles. The flesh of both the walrus and the seal is their chief article of food, and the ivory of the former is sold to passing traders for rum, breech-loading arms, ammunition, tobacco, and a few trifles. The skins of the seal ("lavtak") form an article of trade with the natives of the mainland, America and Asia. This isolated community seems to be very prosperous.

Proceeding down the coast, and entering the vast estuary of Norton Sound, we find on its northern coast a deep indentation, Golovnin Sound. Here indications of lead and silver have been found, and the ubiquitous prospector has already visited the spot with his pick and shovel. The results of the enterprise, however, have not thus far been made definitely known.

The most important locality, however, on this coast is the trading post of St. Michael, where rival firms have established their depots for the Yukon River and arctic trade. At this place each firm has its managing agent for the district, who is supplied once a year with a cargo of goods from San Francisco. The station keepers from the interior come down to the coast at the end of June or the 1st of July, and each receives his allotment of goods to take back with him in sailboats and bidars during the few months when navigation on the river is not impeded by ice. The vessels supplying this depot can seldom approach the anchorage of St. Michael before the end of June on account of large bodies of drifting ice that beset the waters of Norton Sound and the straits between St. Lawrence Island and the Yukon Delta.

In the description of this division we must include the island of St. Lawrence. This island originally had a population of about 1,000, but during the winter of 1878, on account of the failure to lay in supplies during the hunting season, a period of general starvation occurred, which caused the death of at least 400 men, women, and children, principally the latter two classe . There are several villages on the island inhabited by a tribe of Asiatic or western Eskimo. They are tall, straight, and muscular, are generally good looking, and subsist principally upon the walrus and the seal, generally taking only as much as is actually needed for their immediate wants, without providing for the future. They make houses, boats, clothing, etc., of the skins of the walrus, and sell whalebone and ivory to traders for rum and breech-loading arms. Living directly in the track of vessels bound to the Arctic for the purpose of whaling and trading, this situation has been a curse to them; for as long as the rum lasts they do nothing but drink and fight among themselves, and whenever they collect a few furs, instead of exchanging them for provisions or clothing, they refuse to sell them for anything but whisky, breech-loading arms, and ammunition.

There is a chapel at St. Michael, but the headquarters of the Greek Catholic Church, which has the only established mission in this division, is at Ikogmute, on the Yukon River, just opposite the point where the Kuskokwim portage comes over. Here there is a church with several church buildings under control of an ordained priest, whose influence over these people is very small. On paper he lays claim to having 3,000 parishioners, but I was unable at any settlement to recognize his title, even approximately. The worthy priest abounds in faith, however, and, in addition to his first-cited claim, also reports that he holds 600 more "nearly persuaded," as if it were a mere question of time to gather them in finally.

The people of the United States will not be quick to take to the idea that the volume of

water in an Alaskan river is greater than that discharged by the mighty Mississippi; but it is entirely within the bounds of honest statement to say that the Yukon River, the vast deltoid mouth of which opens into Norton Sound of Bering Sea, discharges every hour one-third more water than the Father of Waters. There is room for some very important measurements to be made in this connection, which I hope will soon be made. We know the number of cubic feet of water which the Mississippi rolls by New Orleans every day, but we do not possess authority concerning the volumes of the flood discharged by the Yukon. Entering the mouth, or rather any one of the mouths, of this large river, we are impressed first by the exceeding shallowness of the sea 50 miles out from it, varying in depth from 2 to 3 fathoms; and, second, by the mournful desolate appearance of the country itself, which is scarcely above the level of the tide, and which is covered with a monotonous cloak of scrubby willows and rank grasses. The banks, wherever they are lifted above the reddish current, are continually undermined and washed away by the flood, and so sudden and precipitate are these landslides at times that traders and natives have barely escaped with their lives. For 100 miles up through an intricate labyrinth of tides, blind and misleading channels, sloughs, and swamps we pass through the same dreary, desolate region, until the higher ground is first reached at Kusilvak, and until the bluffs at Andreievsky and at Chatinakh give evidence of the fact that all the land in Alaska is not under water. It is watered, however, here, there, and everywhere, and impresses one with the idea of a vast inland sea; which impression holds good even as far up the river as 700 or 800 miles, where there are many points, even far in the interior, at which this river spans a breadth of 20 miles from shore to shore. As we advance toward its source we are not surprised, when we view the character of the country through which it rolls, at the vast quantity of water in its channel. It would seem as though the land itself drained by the river on either side within Alaska were a sponge, into which all rain and moisture from the heavens and melting snow are absorbed, never finding their release by evaporation, but conserved to drain, by myriads and myriads of rivulets, the great watery highway of the Yukon. I noticed a striking evidence of the peculiar nonconductive properties of the tundra mosses, or swale, last summer in passing through many of the thousand and-one lakes and lakelets peculiar to that region, where the ice had bound up the moss and overhanging water growth at the edges of the lakes. In the breaking up and thawing out of summer that ice failed to melt, and the renewed growth of the season of vegetation, reaching out in turn from this icy border, will again prevent thawing, and so on until shallow pools and flats are changed into fixed masses of ice hidden from view.

The borders of the bed of this river alternate from side to side, with flats here and low hills there, the river shifting from one to the other. The hills above the mission as well as the rolling uplands are all timbered, while the flats are covered with rank grasses and willow thickets. This river is bound by ice in October and is not released until the sun of June exerts its power. A very remarkable occurrence in connection with this annual event took place in the summer of 1880, by which a famine ensued at the mouth of the Yukon, and the people thereof were obliged to repair for food to neighboring settlements far to the northward, or on the Kuskokwim. The ice came down the Yukon in such masses and in such profusion that it grounded in the deltoid mouth in the month of July, so as to form a barrier against the running of the salmon.

A list of settlements and stations in the Yukon division with their respective population is here appended, as follows:

YUKON DIVISION.

Settlements.	Location.	Total.	White.	Creole.	Athabaskan.	Eskimo.	Settlements.	Location.	Total.	White.	Creole.	Athabaskan.	Eskimo.
Cape York	Bering Sea	24	....	....	.....	24	Aziak	Sledge Island, Bering Sea.	50	....	....	.....	50
Siniogamute	Port Clarence.	36	....	....	.....	36							
Kaviazagamute	Lake Imorook	200	....	....	.....	200	Small village opposite on mainland.	Bering Sea	10	....	....	.....	10
Nook	Cape Douglas, Bering Sea.	36	....	....	.....	36	Ooinnakhtagowik	North coast of Norton Sound.	10	....	....	.....	10
Ookivagamute	Kings Island, Bering Sea.	100	....	....	.....	100							

YUKON DIVISION—Continued.

Settlements.	Location.	Total.	White.	Creole.	Athabaskan.	Eskimo.
Ayacheruk	North coast of Norton Sound.	60	.....	.....	.....	60
Chitnashuak	do	20	.....	.....	.....	20
Imokhtagokshuk	do	30	.....	.....	.....	30
Okpiktolik	do	12	.....	.....	.....	12
Tupkaak	do	15	.....	.....	.....	15
Chiookak	do	15	.....	.....	.....	15
Ignituk	do	100	.....	.....	.....	100
Atnuk	do	20	.....	.....	.....	20
Nubviakhchugaluk	do	30	.....	.....	.....	30
Kvikh	do	30	.....	.....	.....	30
Ogowinagak	do	20	.....	.....	.....	20
Scattered villages	Head of Norton Bay.	20	.....	.....	.....	20
Oonakhtolik	East coast of Norton Sound.	15	.....	.....	.....	15
Shaktolik	do	60	.....	.....	.....	60
Tuphamikva	do	10	.....	.....	.....	10
Oonalakleet	do	100	.....	.....	.....	100
Igawik	do	8	.....	.....	.....	8
Kegokhtowik	do	20	.....	.....	.....	20
Ketchumville	do	5	3	2	.....	.....
St. Michael and Tachik village.	do	109	4	5	.....	100
Pikmiktalik	do	10	.....	.....	.....	10
Pastoliakh	do	80	.....	.....	.....	80
Kotlik	Yukon Delta	8	.....	.....	.....	8
Fetkina	do	30	.....	.....	.....	30
Village (name unknown)	do	6	.....	.....	.....	6
Ingechuk	do	8	.....	.....	.....	8
Kashutuk	do	18	.....	.....	.....	18
Chefokhlagamute, 1st	do	15	.....	.....	.....	15
Chefokhlagamute, 2d	do	5	.....	.....	.....	5
Chefokhlagamute, 3d	do	6	.....	.....	.....	6
Igiagagamute	do	10	.....	.....	.....	10
Askinuk	do	175	.....	.....	.....	175
Kashunok	do	125	.....	.....	.....	125
Kalaligamute	do	100	.....	.....	.....	100
Ookagamute	do	25	.....	.....	.....	25
Oonakagamute	do	20	.....	.....	.....	20
Village (name unknown)	do	15	.....	.....	.....	15
Kwigathlogamute	do	30	.....	.....	.....	30
Nunochogamute	do	40	.....	.....	.....	40
Nauvogalokhlagamute	do	100	.....	.....	.....	100
Villages on Big Lake region.	do	166	.....	.....	.....	166
Coast between Pastoliakh and Cape Rumiantsof.	do	300	.....	.....	.....	300
Komarofs Odinotchka	Yukon River.	13	.....	1	.....	12
Alexeiefs Odinotchka	do	16	.....	1	.....	15
Elisciefs Barabara	do	20	.....	.....	.....	20
Chatinakh	do	40	.....	.....	.....	40
Andreievsky Redoute	Yukon River.	14	1	1	.....	12
Starikvikhpak	do	90	.....	.....	.....	90
Razboinik	do	151	.....	.....	.....	151
Ooglovia	do	102	.....	.....	.....	102
Ingahame	do	63	.....	.....	.....	63
Single house	do	10	.....	.....	.....	10
Staraie Selenie	do	55	.....	.....	.....	55
Ikogmute, mission	do	148	.....	5	.....	143
Johns station	do	37	1	1	.....	35
Rybnia	do	40	.....	.....	.....	40
Pogoreshapka	do	121	.....	.....	.....	121
Single house	do	9	.....	.....	.....	9
Palmute	do	89	.....	.....	.....	89
Askhomute	do	30	.....	.....	.....	30
Ignokhatskamute	do	175	.....	.....	.....	175
Makeymute	do	121	.....	.....	.....	121
Anvik station and village.	do	95	1	.....	94	.....
Single house	do	20	.....	.....	20	.....
Single house	do	12	.....	.....	12	.....
Single house	do	15	.....	.....	15	.....
Tanakhothaiak	do	52	.....	.....	52	.....
Single house	do	15	.....	.....	15	.....
Chageluk settlements	Chageluk Slough and Innok River.	150	.....	.....	150	.....
Khatnofoutze	Yukon River.	115	.....	.....	115	.....
Kaiakak	do	124	.....	.....	124	.....
Kaltag	do	45	.....	.....	45	.....
Nulato, station and village.	do	168	2	3	163	.....
Koyukuk settlements	Koyukuk River.	150	.....	.....	150	.....
Terentiefs station	Yukon River.	15	.....	.....	15	.....
Big Mountain	do	100	.....	.....	100	.....
Single house	do	10	.....	.....	10	.....
Sakatalan	do	25	.....	.....	25	.....
Yukokakat	do	6	.....	.....	6	.....
Melozikakat	do	30	.....	.....	30	.....
Mentokakat	do	20	.....	.....	20	.....
Soonkakat	do	12	.....	.....	12	.....
Medvednaia	do	15	.....	.....	15	.....
Noyokakat	do	107	1	.....	106	.....
Kozmas	do	11	.....	.....	11	.....
Nuklukaiet	do	29	2	.....	27	.....
Rampart village	do	110	.....	.....	110	.....
Fort Yukon	do	109	2	.....	107	.....
Fort Reliance	do	83	1	.....	82	.....
Gens de Large	do	120	.....	.....	120	.....
Fetoutlin (David's people).	do	106	.....	.....	106	.....
Tanana villages	Tanana River.	700	.....	.....	700	.....
St. Lawrence Island	Bering Sea	500	.....	.....	.....	500
Total		6,870	18	19	2,557	4,276

The Russian mission on the Yukon River claimed in the year 1880 that 2,252 of the natives were professors of Christianity, but personal observations led me to believe that this estimate is exaggerated, comprising as it does quite a number of individuals in distant settlements to which this zealous missionary can show no title beyond a wholesale sprinkling of the village during a hurried visit. In 1880 there was no school in existence within the jurisdiction of this mission, but steps were being taken by the bishop for the location of an educational establishment at Ikogmute.

The trade of the Yukon division has been thus far confined altogether to the barter with the natives for furs, seal oil, and some walrus ivory along the coast. The importations of goods and provisions in payment of these native productions are quite large, amounting in the year 1880 to 150,000 pounds of flour, 100 chests of tea of 52 pounds each, 150 half-barrels of brown sugar, and 50 half-barrels of white sugar. The consumption of flour alone foots up 25 pounds for each man, woman, and child in the district, and the demand for this article is increasing annually. The dry goods, hardware, etc., imported, together with this large quantity of provisions, represented in 1880 a value of nearly $20,000.

The furs obtained in exchange for these provisions numbered 27,356, of all kinds, divided as follows:

Wolf	32	Marten	2,000
Lynx	310	Mink	7,774
Beaver	3,781	Bear	152
Silver fox	206	Muskrat	2,000
Cross fox	800	Land otter	310
Red fox	5,000		
White fox	1,791	Total	27,356
Beaver	3,200		

The market value of these skins was between $75,000 and $80,000.

The superficial area of the Yukon division is 176,715 square miles, which, with a total population of 6,870, would indicate a density of population at the rate of 1 inhabitant to 25⅞ square miles, the number of whites and creoles (19 and 18, respectively) being too small to be taken into consideration in this connection.

THE KUSKOKWIM DIVISION.

The third geographical division is named after the river next in size to the Yukon among Alaskan streams, and comprises the whole of the Kuskokwim Valley, with all its tributaries, and two other rivers, the Togiak and the Nushegak, also emptying into Bering Sea.

The length of the main artery of this division is not known, the head waters of the Kuskokwim having thus far been untouched by the explorer or trader. We have the statements of natives to the effect that the upper Kuskokwim River flows sluggishly through a vast plateau or valley, the current acquiring its impetus only a short distance above the village of Napaimute. From this point down to the trading station of Kalmakovsky and to the southern end of the portage route between this river and the Yukon the banks are high and gravelly, and chains of mountains seem to run parallel with its course on either side. This section of the Kuskokwim Valley is but thinly populated, though apparently the natural advantages are far greater than on the corresponding section of the Yukon. The soil is of better quality, and is sufficiently drained to permit of a more luxuriant growth of forest trees, shrubs, and herbs.

Such indications of minerals as have been found here are the most promising of those in any portion of western Alaska, consisting of well-defined veins of cinnabar, antimony, and silver-bearing quartz.

Game and fur-bearing animals do not abound in this section of the river valley, as it is an old hunting ground and has been drained by constant traffic for more than half a century. The principal business of the traders at Kalmakovsky is derived from the almost unknown head waters of the river, where the beaver, marten, and fox are still plentiful.

From the head waters down to Kalmakovsky the people belong to the interior Indians, or Athabaskans, and for some distance below this point there seems to be a mixed race of Innuits and Indians; but from the village of Okhogamute down to the coast of Bering Sea the Eskimo alone appears on both banks of the Kuskokwim, peopling also the section of the delta between Cape Vancouver (Nelson Island) and the mouth of the river and the island of Nunivak, lying off the coast. This triangular section having for its apex the above-mentioned village, teems with population. Villages dot the banks of the river at intervals, the distance between them gradually decreasing toward the seacoast, while on the delta the lakes and sluggish streams are lined with numerous settlements.

According to our standard, the people of the lower Kuskokwim River and of the tundras are very poor indeed, their country offering nothing but seals in the sea and the river, myriads of minks, some foxes, the brown bear, and a few moose. Among these animals the hair seal is of the greatest importance, furnishing oil and lavtaks (dried seal hides), the chief articles of trade with the white and native traders on the upper river. The skin of the mink is of so little value that traders often refuse to buy unless in very large quantities. Altogether these people would be in a sorry plight were it not for the abundant supply of salmon during the summer. They all flock together on the banks of the Kuskokwim, and fairly line the river with fish traps and drying frames, or poles, and from the beginning of June to the month of August the traps are constantly emptied and filled again. The quantity of fish secured during the season is very great, even in proportion to the number of inhabitants; but when we consider the wasteful practice of drying the fish until only a small fraction of the original substance remains, it can not astonish us to hear the natives complain of an insufficient supply. Over 4,000 people lay in the winter supply for themselves and for their dogs during a few months of summer, but it is safe to state that with a more economical mode of preserving the fish four times the number could live in comfort within the same space.

A glance at the map will show a very conspicuous broad opening through which the strong current and turbid waters of the Kuskokwim are discharged into Bering Sea. The tides in this capacious estuary run with a surprising velocity and an enormous vertical rise and fall.

At the village of Agaligamute I saw a mound, the apex of which was over 50 feet above the level of the sea at low water, totally submerged by the flood tide, assisted by a southwesterly gale. This extraordinary change of tide level extends up into the mouth of the river beyond the point where the trading schooners discharge their cargoes at Shineyagamute.

At each succeeding flood tide a traveler in his bidarka can pass over willow thickets of large size and groves of poplar, while at low tide he finds himself sunk between high banks of bottomless mud, shutting him out from all view of the interior. The aspect of the country here, as far as it lies under the direct influence of the changing tide, is strikingly desolate and forlorn. The settlements along the banks and the tributary swamps of this river are located on little patches or narrow dikes only just above high water, and from here across to the hills to the eastward extends a great swale or watery moor of from 40 to 60 miles in width. Hummocks and ridges afford a path to the hunter here and there, and when the river is at its ebb the great flats of mud and slimy ooze are bare. A rank and luxurious growth of coarse water grass, reeds, and rushes covers the whole expanse, with little clumps of dwarf willows and poplar along the elevated tide rim.

The native villages are ranged close together, each occupying all the dry land in its immediate vicinity. It is difficult even to find sufficient dry ground outside of the houses upon which to pitch a tent, and at low tide it is almost impossible to pass between the village and the water's edge, a mile or more away, separated as they are by an almost impassable mud.

On the western bank of the lower Kuskokwim the land is also low and swampy, and the settlements are more widely separated from each other. In the lower part of this stream, in the vicinity of Good News Bay, where one bank can no longer be sighted from the other, there exists a group of low bars or islets, upon which both the common seal and the maklak are said to "haul up" to breed. This statement has not, however, been definitely established, and it is

probable that here, as elsewhere, these marine mammals bring forth their young on the ice; certain it is that large numbers of seals are killed on and in the immediate vicinity of these banks. The whole domestic economy of the natives here seems to be founded upon the maklak and the beluga, and the oil procured from them is the currency with which they purchase some necessaries and a few luxuries of life. Their clothing, manufactured of the skin of the ground squirrel, or yeveashka, is purchased with oil, and the few garments of cotton drill and gaudy prints to be found among them have been obtained in the same manner.

The density of population, as portrayed in the list of settlements on the river mouth and the country immediately adjoining, is such that in their active and energetic fishing for their own consumption they seem to absorb the greater part of the salmon run—at least the natives on the upper river complain quite frequently of the scarcity of this fish. This state of affairs may, however, be ascribed partly to the fact that not only do the Kuskokwim people proper fish here, but large numbers come annually from the lower delta of the great Yukon, where the run of salmon occasionally proves a total failure on account of ice grounding in the shallow channels and keeping the fish from ascending.

For many years one trading station belonging to one of the wealthy San Francisco companies seemed to absorb the whole trade of the Kuskokwim River. Two years ago, however, a rival agency was established, and at present there seems to be traffic enough to afford to each firm a moderate profit. The most valuable skins shipped from this region are those of martens and of foxes, procured from the roving tribe of Koltchanes inhabiting the terra incognita about the head waters of the Kuskokwim.

There is another feature in this country which, though insignificant on paper, is to the traveler the most terrible and poignant infliction he can be called upon to bear in a new land. I refer to the clouds of bloodthirsty mosquitoes, accompanied by a vindictive ally in the shape of a small poisonous black fly, under the stress of whose persecution the strongest man with the firmest will must either feel depressed or succumb to low fever. They hold their carnival of human torment from the first growing of spring vegetation in May until it is withered by frosts late in September. Breeding here as they do, in the vast network of slough and swamp, they are able to rally around and to infest the wake and the progress of the explorer beyond all adequate description, and language is simply unable to portray the misery and annoyance accompanying their presence. It will naturally be asked how do the natives bear this? They, too, are annoyed and suffer, but it should be remembered that their bodies are anointed with rancid oil, and certain ammoniacal vapors, peculiar to their garments from constant wear, have a repellant power which even the mosquitoes, bloodthirsty and cruel as they are, are hardly equal to meet. When traveling, the natives are, however, glad enough to sieze upon any piece of mosquito net, no matter how small, and usually they have to wrap cloths or skins about their heads and wear mittens in midsummer. The traveler who exposes his bare eyes or face here loses his natural appearance; his eyelids swell up and close, and his face becomes one mass of lumps and fiery pimples. Mosquitoes torture the Indian dogs to death, especially if one of these animals, by mange or otherwise, loses an inconsiderable portion of its thick hairy covering, and even drive the bear and the deer into the water.

The second river system belonging to this division is that of the Togiak, a stream emptying into the western portion of the coast indentation between capes Newenham and Constantine.

The course of this river is brief, the distance between the high plateau from which it springs and the seacoast being not much over 100 miles, but it is broad and has many lake-fed tributaries, and its banks are lined with populous villages.

This whole region is poor in such natural products as white men desire, and one of the results of this poverty is that no white trader has ever thought it worth his while to visit these people. The Togiak Eskimo seem to live by hundreds and even thousands in an almost primitive state, without craving for any of the white man's possessions, with the sole exception of tobacco, an article they have received from surrounding tribes, and which they have learned to appreciate. They seem to live without any tribal authority or organization, and have no chiefs, each family

managing its own affairs, coming and going with perfect freedom, without any regard for the wishes of other members of the community. Whole families and communities leave their winter houses or subterranean dwellings as fancy takes them, select some point on the tundra or on the river bank, and pass two or three months with no other shelter than that afforded by their upturned kaiaks and a waterproof shirt made of deer entrails and bladders stretched over paddles and spears. As the wind changes they shift this unsatisfactory shelter about, seemingly caring for nothing beyond a small space to lay their heads where they are not exposed to the pelting rain or snow.

Brown bears (*Ursus Richardsonii*) are plenty in the swampy river bottom during the fishing season, and are boldly attacked by the men with spears and lances; but when the salmon disappears the populace migrate inland to the hills and devote a month or two to the ardent pursuit of the ground squirrel to replenish their stock of clothing. The skins of minks and foxes alone are from time to time taken down to a small trading post on the seacoast and exchanged for tobacco by one or two courageous individuals who act as middlemen.

In the winter, herds of moose are said to visit the Togiak River Valley, and, being easily hunted and overtaken in the deep snow, afford a welcome change of diet to the natives. Along the mountain range extending between the Kuskokwim and the Togiak rivers, and impinging upon the sea at Cape Newenham, reindeer are plenty, and are hunted constantly by the natives on both sides of the divide. Of the country between the head waters of the Togiak and the Kuskokwim nothing is known, but it is safe to conclude that it is not permanently inhabited.

Turning away from these populous villages, with their mound-like, grass-grown dwellings, upon the apex of which the natives are wont to perch, gazing out to sea or into vacancy, recalling the aspect of a village of prairie dogs on an enlarged scale, we leave behind us the most primitive among the native Eskimo south of Bering Strait.

In the Nushegak district, named after the third river comprised in the Kuskokwim division, we find everywhere traces of long and intimate intercourse with the Russians, who made this valley and a series of lakes their highway of trade, connecting Bristol Bay with Kalmakovsky Rédoute and St. Michael.

The houses in all of this district outside of the missionary settlement of Nushegak are much the same as in the other northern divisions, and may be described as follows: A circular mound of earth, grass-grown and littered with all sorts of household utensils, a small spiral coil of smoke rising from the apex, dogs crouching upon it, children climbing up or rolling down, stray morsels of food left from one meal to the other, and a soft mixture of mud and offal surrounding it all. The entrance to this house is a low, irregular, square aperture, through which the inmate stoops, and passes down a foot or two through a short, low passage onto the earthen floor within. The interior generally consists of an irregularly shaped square or circle 12 or 15 or 20 feet in diameter, receiving its only light from without through the small smoke opening at the apex of the roof, which rises, tent-like, from the floor. The fireplace is directly under this opening. Rude beds or couches of skins and grass mats are laid, slightly raised above the floor, upon clumsy frames made of sticks and saplings or rough-hewn planks, and sometimes on little elevations built up of peat or sod. Sometimes a small hallway with bulging sides is erected over the entrance, where, by this expansion, room is afforded for the keeping of utensils and water vessels and as a shelter for dogs. Immediately adjoining most of these houses will be found a small summer kitchen, a rude wooden frame, walled in and covered over with sods, with an opening at the top to give vent to the smoke. These are entirely above ground, rarely over 5 or 6 feet in diameter, and are littered with filth and offal of all kinds, serving also as a refuge for the dogs from the inclement weather.

In the interior regions, where both fuel and building material are more abundant, the houses change somewhat in appearance and construction; the excavation of the coast houses, made for the purpose of saving both articles just mentioned, disappears and give way to log structures above the ground, but still covered with sod. Living within convenient distance of timber, the people here do not depend so much upon the natural warmth of mother earth.

The coast between the Togiak and the Nushegak is very sparsely peopled, but a few small

villages are located in the large bays of Ooallikh and Kulluk. The inhabitants of these settlements derive their sustenance from both sea and land, making long journeys in their kaiaks to islands and banks on the sea, the resort of the seal and the walrus, while on the land they hunt the brown bear, the wolf, the fox, and the reindeer. For their clothing they depend upon the ground squirrel, and occasionally the traveler sees a parkee, or shirt-like garment made of the breasts of sea-fowls, cormorants, gulls, and other birds living in millions on the steep, rocky coast.

On the upper Nushegak River and around the numerous lakes from which its waters flow a greater variety of fur-bearing animals and game exists, the marten, mink, wolverine, beaver, land otter, wolf, and bear, and three varieties of the fox being still found here in ample numbers. It is owing chiefly to the indolent habits of the people, who are much given to festive assemblies, where singing and dancing are freely indulged in, that the quantity of furs secured from this district is quite small. A single trading post at Alexandrovsk's Redoute has drained all this extensive interior region for years past, and the trader stationed there asserts that he did as much business in walrus tusks from the coast as in furs from the interior.

The salmon family, the great feeder of all the Alaskan people, frequent in astonishing numbers the Nushegak and other streams emptying into Bristol Bay. The facilities for building traps and weirs are also extraordinary, and American fishermen have for some years been engaged here every season in reaping a rich harvest and shipping the fish, salted in barrels, to market. Hundreds of barrels have been filled with a single clean-up of the trap. The only drawback to this business is the short period over which the run extends, necessitating the employment of a very large number of hands while it lasts. On the Igushek River, entering Bristol Bay from the westward, not more than 40 natives gather their winter store of dried fish on the river.

The walrus, above referred to, are killed only when they leave their natural element and resort to the secluded sandy beaches and bars during the breeding season.

For the temperature of the Kuskokwim division I have but very unsatisfactory data. In the whole valley of the Kuskokwim no observations have been taken, but at Alexandrovsk station, on the Nushegak River, I succeeded in obtaining a set of monthly means of temperature covering the period from September, 1879, to August, 1880, inclusive. These observations were taken by Mr. J. W. Clarke, the agent of the Alaska Commercial Company at that place, as follows:

	Deg. F.		Deg. F.
September, 1879	45.1	March, 1880	21.2
October, 1879	32.0	April, 1880	26.5
November, 1879	24.8	May, 1880	36.3
December, 1879	11.5	June, 1880	46.5
January, 1880	1.5	July, 1880	54.1
February, 1880	14.2	August, 1880	53.0

The observer remarked that the winter of 1879–80 had been unusually severe. Another set of mean temperatures, covering the winter months, is as follows:

	Deg. F.		Deg. F.
November, 1878	26.1	March, 1879	23.7
December, 1878	26.6	April, 1879	29.1
January, 1879	20.7	May, 1879	35.8
February, 1879	10.0		

I append a tabulated list of the villages and stations in this division, with their population, as follows:

KUSKOKWIM DIVISION.

Settlements.	Location.	Total.	White.	Creole.	Aleut.	Athabaskan.	Eskimo.
Nunivak Island	Bering Sea	400	...	...	...	...	400
Tanunak	Nelson Island	8	...	...	...	...	8
Kaliookhlogamute	do	30	...	...	...	...	30
Kashigalogamute	do	10	...	...	...	...	10
Nulakhtolagamute	Yukon delta	25	...	...	...	...	25
Agiukchugamute	do	35	...	...	...	...	35
Chichinagamute	do	6	...	...	...	...	6
Chalitmute	do	60	...	...	...	...	60
Anogogmute	do	75	...	...	...	...	75
Kongiganagamute	do	175	...	...	...	...	175
Koolvagavigamute	do	10	...	...	...	...	10
Kinagamute	Kuskokwim River	60	...	...	...	...	60
Village at headwaters.	do	50	...	...	...	50	...
Napaimute	do	60	...	...	...	60	...
Roaming Koltchane	do	35	...	...	...	35	...
Kalmakovsky Rédoute.	do	12	2	2	...	3	5
Kokhlokhtokhpagamute.	do	51	...	...	...	...	51
Toolooka-anahamute.	do	59	...	...	...	...	59
Okhogamute	do	130	...	3	...	...	127
Kaltkhagamute	do	106	...	...	...	...	106
Oogovigamute	do	206	...	...	...	...	206
Single house	do	10	...	...	...	...	10
Tookhlagamute	do	92	...	...	...	...	92
Single house	do	10	...	...	...	...	10
Kwigalogamute	do	314	...	...	...	...	314
Tuluksak	do	150	...	...	...	...	150
Akkiagmute	do	175	...	...	...	...	175
Paimute	do	30	...	...	...	...	30
Kik-khtagamute	do	232	...	...	...	...	232
Kuljkhlugamute	do	75	...	...	...	...	75
Kooigamute	do	215	...	...	...	...	215
Mumtrekhlagamute station.	do	29	...	...	...	...	29
Mumtrekhlagamute village.	do	41	...	...	...	...	41
Napaskiagamute	do	196	...	...	...	...	196
Napahaiagamute	do	98	...	...	...	...	98
Lomawigamute	do	81	...	...	...	...	81
Taghiaratzoriamute	do	52	...	...	...	...	52
Naghikhlavigamute	do	193	...	...	...	...	193
Akooligamute	do	162	...	...	...	...	162
Kakhuiyagamute	do	8	...	...	...	...	8
Shovenagamute	do	58	...	...	...	...	58
Kik-khuigagamute	do	9	...	...	...	...	9
Apokagamute	do	94	...	...	...	...	94
Chimiagamute	Kuskokwim River	71	...	...	...	...	71
Iliutagamute	do	40	...	...	...	...	40
Kuskokvagmute	do	24	...	...	...	...	24
Shineyagamute	do	40	...	...	...	...	40
Quinchahamute	Kuskokwim Bay	83	...	...	...	...	83
Agaligamute	do	120	...	...	...	...	120
Takiketagamute	do	21	...	...	...	...	21
Kl-changamute	do	18	...	...	...	...	18
Mumtrahamute	Good News Bay	162	...	...	...	...	162
Tzahavagamute	Bering Sea Bay	48	...	...	...	...	48
Aziavigamute	Azivigiak River	132	...	...	...	...	132
Togiagamute	Togiak River	276	...	...	...	...	276
Ikaliukha	do	192	...	...	...	...	192
Tunniakhpuk	do	137	...	...	...	...	137
Kassiamute	do	615	...	...	...	...	615
Nulatnk	do	211	...	...	...	...	211
Kissaiakh	do	181	...	...	...	...	181
Annugannok	do	214	...	...	...	...	214
Togiak station	Bering Sea	24	...	4	2	...	18
Ocallikh	do	68	...	...	...	...	68
Kulluk	Kulluk Bay	65	...	...	...	...	65
Igushek	Igushek River	74	...	...	...	...	74
Anagnak	Nushegak River	87	...	...	...	...	87
Nushegak(Alexandrovsk).	do	178	1	86	...	...	91
Kanulik	do	142	...	...	...	...	142
Kakuak	do	104	...	...	...	...	104
Akulvikchuk	do	72	...	...	...	...	72
Agivivak	do	52	...	...	...	...	52
Kalignak	do	91	...	...	...	...	91
Molchatna villages	Molchatna River	180	...	...	...	180	...
Akuliakhpuk	Lake of same name.	83	...	...	...	...	83
Ekuk	Bristol Bay	112	...	...	...	...	112
Koggiung	Kvichak River	29	...	...	...	...	29
Kaskinakh	do	119	...	...	...	...	119
Chikak	Ilyamna Lake	51	...	...	...	51	...
Ilyamna	do	49	...	13	...	36	...
Kichik	Kichik Lake	91	...	...	...	91	...
Paugwik (two villages).	Naknek River	192	...	...	...	...	192
Ik-khagmute	Lake Walker	162	...	...	...	...	162
Igagik	Alaska Peninsula	120	...	2	...	...	118
Oognshik	do	177	...	1	176	...	...
Oonaugashik	do	37	...	...	37	...	...
Mashikh	do	40	...	...	40	...	...
Total		8,911	3	111	255	506	8,036

The superficial area of the Kuskokwim division is 114,975 square miles, and its total population 8,911. These figures would indicate a proportion of 1 inhabitant to every 13 square miles. The number of whites and creoles in this division (114 in all) is too small to take into consideration in this connection.

THE ALEUTIAN DIVISION.

Before proceeding eastward along the continent of Alaska in our brief survey of the geographical divisions of the Territory, we turn our attention to the Aleutian division, comprising the Aleutian Islands, from the Shumagin group, in the east, to the island of Attoo, in the extreme west, and also a small section of the Aliaska Peninsula at its southern extremity. The islands appear to be a mere continuation of the main Alaskan range of mountain groups. Many of these islands contain volcanic peaks, and some of them are still in a state of moderate activity. Slight shocks of earthquakes are common throughout the chain, but many years have elapsed since the occurrence of violent phenomena traceable to volcanic action. All the islands are mountainous, and many of them exhibit snow-covered peaks of from 4,000 to 8,000 feet in height. The entire division is treeless, dwarfed specimens of creeping willow being the nearest approach to timber found anywhere on the islands or mainland. The soil consists of vegetable mold, clays, volcanic detritus, and here and there a light calcareous loam. Grasses of all kinds grow in great abundance, except in the interior valleys and plateaus, where a lack of drainage has allowed dense masses of sphagnum to prevail over the perennial grasses natural to the soil. The surface of the soil everywhere, even where very tall grasses seem most luxuriant, is cut up into hummocks to such a degree that to travel on foot is exceedingly difficult and tiresome.

No mineral has been found in this division with the exception of its eastern extremity, where on the island of Ounga deposits of coal have been discovered, and thoroughly prospected through a long series of years. The quality of the coal was such, however, as to make competition with other coal regions of the Pacific coast impossible.

The abundance of grass throughout this region would naturally lead to the conclusion that it might be adapted to cattle-breeding or the dairy industry, especially since the mean temperature is not at all low; but the winters are sufficiently prolonged to necessitate the feeding of cattle with hay for six or seven months of the year, and the dampness of the climate makes the curing of hay very uncertain and laborious. Under the auspices of the Russian Government a weather average of seven years was obtained and recorded by the missionary Veniaminof. This has the remarkable showing of 53 clear days, 1,263 cloudy days, and 1,230 days with snow, rain, or hail. At Oonalashka, the only place where cattle are now kept by the priest and by the traders, hay can be obtained from San Francisco cheaper than it can be cut and cured on the spot. Potatoes have not thus far been successfully grown in any part of this division; but whether this be due to the quality of the soil or to the climate, or to lack of proper attention to the subject, I am not in a position to decide. I merely note the fact.

The people inhabiting this district, though distinct in language and, to a certain extent, in habits, are undoubtedly of Eskimo origin. They were the first tribe subjugated by the Russian adventurers who invaded this region about the middle of the last century, and, having maintained ever since that time the most intimate relations with their conquerors, their individuality as a race or tribe has almost completely disappeared.

In their connection with the Russian Church the people of this division are divided into two parishes and one independent church organization. The parishes are Belkovsky, in the east, comprising the Shumagin group of islands and the settlements on the southern extremity of the Aliaskan Peninsula, and Oonalashka parish, in the west, comprising all the islands from Avatanok to Attoo. The parish churches are located at Belkovsky and Oonalashka or Iliuliuk village, but nearly every settlement contains a small chapel, where prayers are read by unpaid native subordinate members of the clergy. An independent organization exists on the seal islands, where the natives maintain a priest and his assistant at their own expense, and, with some assistance on the part of the lessees of the island, have erected a fine church.

The easternmost permanent settlement of this division is situated in Belkovsky parish, on Delarof Bay, on the island of Ounga, one of the Shumagin group. The Ounga settlement has a population of nearly 200 souls, principally creoles, and presents quite an imposing appearance, owing to quite a number of neat frame buildings erected by prosperous sea-otter hunters. The most important industry of this and the adjoining settlements is the chase of the sea otter, of

which about 600 are secured every year from a range extending over the whole Shumagin group. The outlying islands and rocks, especially those of Simeonof, Nagaĭ, and Vosnessensky, are the favorite hunting grounds. The native hunters have been reenforced here by 15 or 20 white men, who, in order to circumvent the letter of the law, which requires that none but natives shall hunt fur-bearing animals in Alaska, have married native women, and by the special authority of the Secretary of the Treasury are admitted to the same privileges as the people of the country. Being more energetic, and at the same time more reckless, in their pursuit of these valuable animals, these white men have been very successful, and many of them have built or purchased smart little sailing vessels, enabling them to continue their hunting at all seasons of the year, even when the Aleut is kept at home by the gales and storms of winter. The final effect of this indiscriminate hunting must, of course, be extermination. Limited quantities of fox skins of various shades are also secured on the island of Ounga.

The coal veins existing not far from the Ounga settlement on Humboldt Bay have already been referred to.

On the adjoining island of Korovinsky there is a small settlement inhabited altogether by creoles, whose ancestors had formed an agricultural colony under the auspices of the Russian Fur Company. Up to the transfer of the territory these people were not allowed to hunt, and were compelled to maintain themselves by the cultivation of potatoes and turnips and by keeping a few head of cattle, but since that time they have gradually abandoned most of their agricultural pursuits and turned their attention to the more profitable pursuit of the sea otter.

On Popof Island there is a station of fishermen in the employ of a San Francisco firm engaged in the codfishery on the Shumagin banks. The fishing is done to a great extent in small boats on the more shallow banks within a short distance from shore, and the fish are carried to San Francisco in schooners. The number of fish taken annually varies between 500,000 and 600,000.

The trade of Ounga is divided between two rival companies, who have established permanent stores, and many private traders, who pay occasional visits in schooners and sloops.

The next settlement to the westward, named Vosnessensky, is situated on the small island of Peregrebnoi. The population of this village does not exceed 50 souls, but they secure between 60 and 70 sea-otter skins every year, and live in comparative affluence.

One of the most important points in the Aleutian division is the settlement of Belkovsky, situated on the southern end of the Aliaska Peninsula. This is a village containing 300 inhabitants, a fine new church, and many good log and frame buildings. The houses are perched on the summit of a bluff clinging to the flanks of the mountains. There is no sheltered harbor here, or even a safe anchorage for ships, and the gales and storms sweep over the settlement with uninterrupted fury, but the hardy sea-otter hunters select this spot as the one most convenient for setting out upon their expeditions to the outlying rocks and cliffs within a circuit of 50 miles or more. The sole industry of this place is, of course, the chase of the sea otter. The large number of from 1,900 to 2,000 of these rare and costly skins are annually sold at the three trading stores located in the village.

Under some civilizing influence or home restraint this ought to be, comparatively speaking, a wealthy community, but, as the case now stands, every cent of their surplus earnings that is not gathered in for the support of the church by the priests is squandered by the people in dissipation and for useless luxuries. The best and most costly styles of ready-made clothing are in common use, and only when at sea or on their hunting expeditions do the natives wear home-made waterproof garments.

Some 50 or 60 miles to the southward of Belkovsky lies the island of Sannakh, the richest hunting ground of this whole division. Numerous hunting parties from the islands and the mainland to the east and west can be found here at all times of the year, encamped in tents or rude turf and sod shelters, watching for the rare intervals of weather sufficiently fine to allow them to put out to sea in search of their quarry. The trading companies have established here small depots of supplies, in order to take from the hunters every excuse for leaving the island and neglecting their business until they have collected a sufficient number of skins to warrant

their departure for localities affording better opportunities to spend their money. In many instances these parties remain at Sannakh from three to five months at a time, and consist chiefly of men, with one or two women to do camp duty and to provide a few comforts for the drenched, chilled, and exhausted hunter when he returns from the surf-beaten reefs and rocks.

Just north of Belkovsky is the small village of Nikolaievsky, containing less than 50 inhabitants, while to the southward, but still on the mainland of the peninsula, there is the larger settlement of Protassof, or Morshevoi. The latter place contains nearly 100 people, who are successful sea-otter hunters, securing an average of 500 skins every year. These people are equally as opulent and extravagant as their neighbors at Belkovsky, and are even more dissolute. In spite of an average annual revenue of nearly $1,000 to each family, the whole place presents an aspect of great poverty, misery, and debauchery, which has put its stamp more firmly and more shamefully upon the people of this place than elsewhere in all Alaska.

Near this village, less than half a mile away, there is a series of warm sulphur springs and ponds, which would afford the sickly natives partial or permanent relief could they only be induced to bathe therein; but, while there is not one man, woman, or child in the village free from cutaneous disease of some kind, not one of them can be induced to make the exertion necessary to try the efficacy of the waters.

The natural food resources of this whole region—fish, berries, seal, etc.—are abundant and varied. Not far from Morshevoi walrus can be secured with but little difficulty, and large herds of reindeer formerly came down at regular intervals from the upper peninsula to its westernmost point, and even crossed the strait to Oonimak Island, but of late, for some cause unknown, they have ceased to make their appearance. The old men and youths not absorbed by the sea-otter parties, trap foxes all over the mountains and rolling plains and shoot a bear occasionally, while the women are busily engaged in collecting driftwood and brush, the only fuel found in the country.

Passing to the westward from Belkovsky the traveler first notices the snow-covered peaks of two volcanoes on Oonimak Island, of which the larger is Mount Shishaldin, rising to a height of 8,000 feet. Smoke rises constantly from the crater of this mount, and shocks of earthquake occur very frequently. The island is uninhabited, and has been in that condition for the greater part of the present century, though it is richer than many other islands of the Aleutian chain in natural means of sustaining life.

Foxes are quite plentiful here and sea otters frequent the reefs and points, but ever since—nearly 100 years ago—almost all the inhabitants of four or five populous villages were massacred by the Russian promyshleniks, a superstitious dread seems to prevent the Aleutian from making a permanent home at Oonimak.

Three small islands intervene between Oonimak and Oonalashka islands—Avatanok, Akoon, and Akutan—with a small settlement of sea otter hunters on each.

Oonalashka Island, next in size to Oonimak, is the point of greatest importance in this division, having at its principal village (Iliuliuk) the parish church, a custom-house, with the port of entry for all western Alaska, two large trading establishments, wharves, and other commercial facilities. Nearly all the sea otters secured from the Shumagins in the east to Attu Island in the west are collected here and shipped to San Francisco.

The bay of Oonalashka, or Captains Harbor, is completely landlocked, and is free from ice at all times of the year. Codfish and halibut are plentiful throughout the bay, and herring and salmon crowd its waters in each season. It would seem easy for a small community to exist here on the natural resources alone, but the people of Iliuliuk are all sea-otter hunters, going as far as Sannakh and other distant hunting grounds upon expeditions extending over many months. As these men are generally successful, the settlement is nearly as prosperous, financially, as that of Belkovsky, but they find themselves in a better condition, owing to the moral influence of the parish priest located here and the example of quite a number of the whites of a better class who have here congregated. The wharves and shipping afford a constant source of revenue to those of the natives who are able and inclined to labor, and nearly all the families are enabled to dispense with the laborious process of gathering driftwood and small brush for heating

and cooking purposes, buying cordwood imported from Kadiak and coal shipped from British Columbia or San Francisco.

A school, in which both English and Russian are taught, is maintained by one of the trading firms, but the attendance is at best irregular. Nearly 50 per cent of the adults of Iliuliuk, however, are able to read and write in the Aleutian language and a few in the Russian.

The same firm that maintains the school also employs a physician and keeps a well-stocked dispensary, where natives are treated free of charge. This island and the fur-seal islands are the only localities in all Alaska where medical attendance can be obtained.

Experiments in vegetable gardening in Oonalashka Island have not been attended with success. From 8 to 10 cows are kept; but, as already explained above, their sustenance during the winter is obtained with great difficulty.

When first discovered by the Russians this island contained many populous villages, but of these but four remain to-day outside of the harbor settlement. The villages of Makushin, Koshigin, and Chernovsky in the west and Borka in the east are all inhabited by sea-otter hunters, who spend but a small portion of the year in fishing and trapping black and red foxes. Altogether there are between 700 and 800 people on the island of Oonalashka, of which about 25 are white.

As they live here today, in their more than semicivilized condition, each family generally inhabits its own hut or barabara. They have long since ceased to dress themselves in skins or their primitive garments made from the intestines of marine mammals, save at a few points where extreme poverty compels them to wear birdskin parkee and other garments handed down from ancient times. The visitor to any of these Aleutian settlements will find its people dressed in "store clothes," and on Sundays will notice a good many suits of tolerably good broadcloth. The women of the "wealthy" families dress in silks on great occasions, but generally in gowns of cotton fabrics made up with special reference to the latest fashions brought up from San Francisco. Although in their hunting excursions, and frequently when about the village, they still wear the ancient "kamleyka," or waterproof shirt, made from intestines, and also moccasins or boots made of the throats of seals and soled with the tough flippers of the sea lion, they all dress up on Sundays and on church holidays in calfskin boots and ladies' kids and slippers, shipped from San Francisco. Broad-crowned caps with a red band are still much in vogue among the male exquisites, evidently a legacy of former times, when Russian uniforms were seen on these shores. As a rule, however, the males dress soberly, with but little attention to display, color, or ornamentation, though they lavish some skill and taste in trimming their waterproof garments used in the chase or in traveling; as also the seams of the "kamleikas," the skin boots, and other waterproof covers, including those of their canoes and bidarkas, the latter being frequently embellished with tufts of gaily colored sea-bird feathers and delicate lines of goosequill embroidery.

The women have a natural desire for bright ribbons and flashy jewelry, such as the traders supply them with, and the extent to which they deck their persons with gewgaws and trifles of this kind is only limited by their means. With the exception of a few whose lords have been exceptionally fortunate in capturing sea-otters, they seldom wear bonnets or hats; but around their houses or at church they have handkerchiefs of cotton or silk tied over their heads, the married women, after the Russian peasant fashion, drawing them tightly about the head in the shape of a turban, almost completely hiding the hair from view, while the unmarried girls tie them loosely over the top of the head. The hair, when attended to at all, is put up in braids and tied up behind

The interior of Oonalashka Island consists of a labyrinth of ravines and gulleys, with steep, grass-grown hillsides and masses of volcanic rocks and lava, deeply indented and cut in every direction by sparkling streams. Deep snow in winter and a dense growth of vegetation in summer make traveling across the island exceedingly difficult, and it is safe to assert that scarcely one in a hundred of the inhabitants ever penetrates to within a mile of the seashore.

The volcano Makushin, situated between the village of that name and Iliuliuk, though smoking occasionally, has had no eruption during the present century.

The next settlement to the westward is that of Nikolsky, on the southwest coast of Oumnak Island. When the Russians first arrived in this vicinity this island was the site of no less than 11 Aleutian villages and settlements, and the people, who at first welcomed their unknown visitors in the most friendly manner, became subsequently enraged at the treatment received at their hands and offered a stubborn resistance. The struggle here, as elsewhere, resulted in an almost total extermination of the original inhabitants, and Nikolsky, with its 120 inhabitants, is all that is left to-day of a once numerous people. What these people have lost in numbers they have gained in prosperity, selling every year, as they do, their 120 or 150 sea-otter skins to the rival trading firms at excellent prices. Black, cross, and red foxes are quite abundant, and the straits on both sides of the island contain excellent cod-fish and halibut banks. Immediately back of the village, and connected with each other, there are several fresh-water lakes, with an outlet to the sea through a shallow, meandering stream that passes down through the settlement, and at certain seasons of the year trout and salmon run up in such numbers, and with so much persistency, that they fairly crowd themselves out upon its banks, leaving nothing for the natives to do but to stoop down and pick them up. The characteristics of the natives are the same as those described in the review of Oonalashka. They support their chapel, as in other villages, and have their prayers read by one of their own number. Drift wood is less plentiful here than in other districts, and this scarcity involves additional labor on the part of the women, who must gather the "chiksha," or creeping tendrils of the empetrum. The men of Oumnak must also make long journeys to other islands to capture sea-lions and seals, and on that account are not so well supplied with bidarkas.

In the year 1878 the island was disturbed by a volcanic eruption, and a small mud volcano arose between the prominent volcanic peak near the southern end of the island and the village. In 1880 both the old and the new peaks were still smoking, and the latter was sputtering. During the shaking and trembling connected with these phenomena the fish seemed to have left the shores, and the inhabitants were for a season obliged to go to adjoining islands to lay in their winter supply. Quite a number of young fur seals are secured here annually by the natives, these animals passing down from the waters of Bering Sea into the northern Pacific Ocean during the autumn and early winter. The flesh of these animals is greatly prized, and the skins make excellent clothing and bedding.

The next settlement in order as we proceed westward is the village of Nazan, on Atkha Island. The people of this island have always spoken and still speak a dialect differing considerably from that of the Oonalashka people. This difference was deemed sufficiently important by Veniaminof, the missionary of these islands, to have translations made into it of the principal books of prayer and portions of the New Testament used in the church services; and it is interesting to observe how families which have been separated for generations from their kindred on the fur seal islands, or in the Oonalashka district, or even on the Aliaska Peninsula, have preserved their distinct idiom and transmitted it to their children, who to-day speak both dialects distinctly and are proud of the accomplishment.

The village of Nazan contains 230 inhabitants, who are lodged in houses or barabaras of rather respectable appearance. They have a well-preserved little church, and give every indication of being a thrifty and prosperous community. Between 175 and 200 sea-otter skins are annually sold at the two trading stores.

Removed as they live from the evil influences of "too much civilization," the men of Atkha constitute perhaps the finest body of sea-otter hunters in the country. They make long journeys from their home, being carried on sailing vessels with all their hunting paraphernalia, bidarkas, etc., to distant islands where they establish temporary camps and scour the outlying reefs and points, where their experience teaches them to search for the shy sea otter. These hunters remain in camp, engaged in the chase for periods of many months at a time, until, in accordance with previous agreement with the traders, the vessels that carried them out return to take them back. On the return of the pa[illegible] the hunters tally their skins, settle all outstanding obligations, make their donations to the church, and speedily spend the surplus upon the outer and the inner man.

The island of Atkha possesses also other natural resources. Those of the male population who do not go out with the sea-otter parties secure quite a rich harvest of fox skins, the black, cross, and red fox being quite numerous; and even the blue fox (*Vulpes lagopus*), now confined to but few localities throughout Alaska, is still found here.

The women of Atkha are quite expert in the manufacture of fine grass cloth and grass ware, and for this purpose they gather the grasses, dry and prepare them with the greatest care, and spare no amount of labor and unlimited patience in the execution of their designs, which take the form of cigar cases, baskets, mats, and the like. There is something exceedingly tasteful and exquisite in the delicate blending of colors and patterns which the grass workers of Atkha employ in the production of their wares, and an instance is known to me of a workbasket being made to order for a trader by an old native woman as the very best evidence of her skill. She was engaged upon the work six years, and it is unnecessary to say that the basket was a remarkable exhibition of beautiful handicraft.

Formerly the people now located at Nazan lived at Korovinsky Bay, on the north side of the island, where the first church was established as early as 1826; but a few years ago, when both fish and driftwood were becoming scarce, in order to better themselves, they removed to their present village site. Where they are now the Alaska mackerel is quite abundant, and quantities of this palatable fish are salted in barrels and shipped to California.

At one time under the Russian régime Atkha was quite an important place: it was the central depot of the western district, the jurisdiction of which extended westward as far as the Kurile Islands, and the Aleuts now on the Russian seal islands of Bering and Copper, off the Kamchatka coast, are all descendants of natives of Atkha. The Russians introduced cattle and goats here as an experiment in those days. The latter became very unpopular with the timid Aleuts on account of their pugnacious disposition and a morbid propensity for feeding upon the grasses and flowers that grew on the earthen roofs of the barabaras, frequently breaking them in or causing serious leaks. Though there is an abundance of nutritious grasses all over the island, the stock-raising experiment was allowed to lag, and finally, a short time after the transfer of the country to the United States, the last of the bovine race found its way into the soup-kettle and to the tables of the traders.

The numerous islands lying between Atkha and Oumnak in the east and Atkha and Attoo in the west are uninhabited, though nearly all show evidence of ancient settlements. At the present time they are each visited in succession by the sea-otter hunting parties of Atkha.

The extreme western settlement of the United States, or of North America, is located on the island of Attoo. This was the first land made and discovered by the Russians as they navigated eastward from the Commander Islands, on the coast of Kamchatka. Nevodchikof, a trader and navigator, landed here first in 1747. At that time the adjoining island of Agatoo was also inhabited by the Aleutians, but to-day the only settlement is a village of little over 100 inhabitants at the head of the landlocked harbor of Chichagof. These people are pecuniarily perhaps the poorest of the whole Aleutian race, the sea otter, upon which they depend entirely for the means of purchasing such articles of dress and food as they have learned to regard as necessaries, having dwindled down to a mere fraction of the number formerly found on the hunting grounds. The able-bodied men of the village now secure an annual average of only 20 or 25 sea-otter skins. Though the volume of their trade with white men is exceedingly limited, nature supplies them with a profusion of food, and ample supplies of driftwood to serve as building material and fuel. Cod, halibut, and Alaska mackerel occur here in great abundance, and a small species of salmon ascends the shallow streams every year.

The women and children gather large stores of eggs of the aquatic birds that breed along the cliffs and rocky shores, and for many years the most provident among the villagers have caught wild geese alive, clipped their wings, and domesticated them. Their present hunting grounds extend over outlying rocks and islets some distance to the eastward and southward, but in spite of this disadvantage they are strongly attached to the place of their birth, and have declined many offers made by traders to remove them to more favorable localities for hunting the sea otter. Large numbers of sea lions are killed annually in the immediate vicinity, and nearly every

particle of these huge animals can be put to some use. Of the skins they make boat-covers and boots, and also use them in repairing the roofs of their houses. The intestines are made into waterproof garments, the sinews taking the place of thread, while the meat is a very palatable article of diet. Though poor, these people impress the visitor in many respects more favorably than their wealthier and better situated brethren in other parts of the Aleutian chain. The chief of the village, or toyon, acts in the triple capacity of trader, leader in the chase, and leader in the church. Naturally the consumption of flour, sugar, tea, and woolen and cotton goods by this community is limited by the causes above referred to, and for clothing they have recourse to a great extent to the primitive bird-skin parkees and other skin dresses and garments such as were made and worn by their ancestors.

On account of the scanty supply of sea-otters the natives have turned their attention to the protection and preservation of the blue fox, and of these they now kill about 200 annually, with every prospect of increasing their stock in hand. The island itself supplies them with nothing except a great abundance of berries in their season, principally the salmon berry and the *Empetrum nigrum*. The grasses found on all these islands seem to grow here, with exceptional excellence, as high as the waists and even the heads of the people, and are used largely by the people in the manufacture of mats, rugs, screens, etc., adding very much to their domestic comfort; they also weave or plait a great many handsome specimens of grass work in the shape of baskets.

The islands of the Pribylof group comprising the breeding grounds of the fur seal, now occupied by a wealthy trading firm under lease from the United States Government, are four in number, only two of which are frequented by the seals. St. Paul and St. George contain all these so-called rookeries, while Otter and Walrus islands are never visited by the millions of these animals playing in the waters about them. The subject of the fur-seal industry and its commercial and physical aspects has been fully discussed in a monograph written by Mr. H. W. Elliott, under the direction of the Superintendent of Census, and it only remains to say here that the business has been so thoroughly worked up and systematized as to bring it to a par with a well-conducted cattle ranch on a large scale—with this difference, perhaps, that greater care is lavished upon the seals, and greater caution with reference to their comfort, than is generally bestowed by farmers upon their cattle.

The people now classed as natives of the islands are in reality natives and descendants of natives of the various islands of the Aleutian division, a majority having sprung from Atkha and Oonalashka. When the Russian navigator Pribylof discovered the islands, toward the end of the last century, he found them uninhabited, and in order to slay and skin the vast numbers of seals and sea otters then found there it was necessary to import laborers from the more populous districts. Under the Russian régime, when these sealers were lodged in wretched subterranean hovels and were fed upon seal meat and blubber the year round, it was considered a hardship to be stationed there, and the managers of the fur company found it necessary to relieve their force from time to time. Since the islands have fallen under the direct management of the United States Government the condition of the people has been improved to such an extent as to stop all applications for removal from the islands and to create a great demand on the part of the people of other islands to be transplanted there. Under the terms of the lease the lessees have erected comfortable cottages for all the families, and provide them throughout the year with fuel and an abundant supply of salted salmon free of charge. In addition to this, each family derives from the compensation paid by the lessees for the labor of killing and skinning the seals, which is done upon a cooperative plan devised by the natives themselves, a cash income of from $350 to $450.

Many other opportunities arise at various times during the year for adding to their income by labor of various kinds at a good rate of wages. Whatever necessaries, comforts, and luxuries the sealers may desire to procure from the stores are sold to them at very reasonable rates. Were it not for the strong propensity for gambling existing among them every sealer would have his bank account, but even now there is quite a respectable list of names upon the books of the company of those who annually draw interest from deposits in the savings banks of San Francisco. A school on each island, maintained by the lessees, under direct supervision of the special agents

of the Treasury Department stationed on the islands, exerts its beneficial influence among the younger members of these isolated communities. Many of the boys and girls can exhibit quite respectable specimens of penmanship, and even composition in the English language. These were produced at school, and under great pressure; but if the visitor attempts to address one of these youngsters in English the reply will be a grin and a shake of the head. They have not thus far learned to apply the knowledge acquired. The average attendance at the school on St. Paul is 69, and at that on St. George 23, out of a total population of 390.

The islands are of volcanic origin, and almost entirely barren, with the exception of a scant covering of coarse grass on sheltered slopes, and as the climate is exceedingly rigorous and the atmospheric conditions very unfavorable no cultivation of the soil can ever be thought of. There is an abundance of fish in the waters about the islands, but as soon as the ice disappears the seals come, and where millions of these animals, each of which can devour from 15 to 20 pounds a day, are feeding, there can not be much left for the human beings on shore.

On St. George only there is quite a large supply of birds' eggs in the breeding season, and these, with a few walrus secured from Walrus Island, are the only additions that nature makes to the larder of the islanders.

Blue foxes have been transplanted to these islands, and have been carefully protected and preserved from deterioration by the admixture of white foxes that sometimes reach the islands over the ice. At present about 600 of these animals are killed annually, making another addition to the revenues of the community.

I append a tabulated list of the villages and stations in this division, with their population, as follows:

ALEUTIAN DIVISION.

Settlements.	Location.	Total.	White.	Creole.	Aleut.	Settlements.	Location.	Total.	White.	Creole.	Aleut.
Attoo	Attoo Island	107	1	32	74	St. Paul	Pribylof Island	298	14	.....	284
Nazan	Atkha Island	236	2	14	220	St. George	do	92	4	.....	88
Nikolsky	Oumnak Island	127	2	8	117	Belkovsky	Alaska Peninsula	208	11	89	108
Iliuliuk	Oonalashka Island	406	14	162	230	Nikolaievsky	do	43	.....	.....	43
Makushin	do	62	1	30	31	Protassof	do	100	2	21	77
Koshigin	do	74	1	.....	73	Voznessensky	Voznesensky Island	22	1	.....	21
Chernovsky	do	101	3	4	94	Ounga	Ounga Island	185	15	69	101
Borka	do	140	1	6	133	Korovinsky	Korovin Island	44	.....	44	.....
Akutan	Akutan Island	65	2	.....	63	Pirate Cove	Popof Island	7	7	.....	.....
Akoon	Akoon Island	55	1	.....	54	Total		2,451	82	479	1,890
Avatanok	Avatanok Island	19	.....	.....	19						

The superficial area of the Aleutian division is 14,610 square miles, and the total population 2,451, indicating a proportion of one inhabitant to 6 square miles, one white to 178 square miles, one creole to 30½ square miles, and one Aleut to 7¾ square miles.

THE KADIAK DIVISION.

This division comprises the south side of the Aliaska Peninsula as far west as the narrow isthmus between Port Moller and Zakharof Bay, the Kadiak group of islands, the Kenai Peninsula, and the coast of the mainland eastward to Mount St. Elias. Its western and northern boundary is the main Alaska chain of mountains and lake Ilyamna and the continuous mountain groups of the peninsula.

From the head of Bristol Bay, where the Kvichak River discharges the waters of the inland sea of Ilyamna down to Port Moller, the settlements are small and widely scattered. The sea along this coast is very shallow, and sandy bars extend far into the ocean. Being of the same continental Eskimo stock with the inhabitants of the Kuskokwim division, the people here live very much in the same manner.

The huge walrus frequents the coast at nearly all seasons of the year, providing the inhabitants with ample stores of food and canoe material, in addition to their tusks, the latter the common currency of this region. As already mentioned above, these marine mammals are

generally killed on shore outside of their natural element, but the more venturesome among the natives go out to sea in parties of from five to ten canoes and boldly attack the whales frequenting these waters with their young.

The country between Bering Sea and the alpine chain of mountains extending along the eastern shore is a gradually ascending plain, dotted with lakes fed from the glaciers and eternal snows in the east and having their outlets in the west. In the northern portion of the peninsula a belt of timber reaches down in the center to the vicinity of lake Bocharof, but beyond this the forest disappears, and only the deep ravines exhibit a stunted growth of creeping willow and alder brush. The reindeer browses and herds all over this region, retreating during the summer up to their inaccessible retreats among the snowy peaks of the mountain range, where they are often seen by the traveler below as a moving line of black dots winding around the summits. During the autumn and winter they seek the vicinity of the lakes and scatter over the tundra, where they are hunted with comparative ease. Foxes, land otters, martens, and minks are plentiful throughout this section, and the gigantic brown bear of continental Alaska rivals the native fishermen in the wholesale destruction of the finny inhabitants of lake and stream.

The people of Port Moller and Oogashik are of the Aleutian tribe, which in former years made warlike expeditions along this coast, extending as far to the northward as the Naknek River and Lake Walker. At the village situated on one of the feeders of the latter lake the present inhabitants still tell the story of the night attack made by the "bloodthirsty" Aleuts long years ago, when every soul in the place was dispatched without mercy, with the exception of one man, who hid himself under a waterfall close by, and thus survived to tell the tale.

The peculiar formation of this country led to the discovery at an early date of several easy portage routes across the peninsula. The Russian promyshleniks first made their way to Bristol Bay and Nushegak across the peninsula from Kadiak, and found abundant evidence to show that this route of communication had been an intertribal highway for ages past.

During the early years of the Russian-American Company's sway in these regions a large proportion of their traffic was carried on in this way from Kadiak to Bristol Bay, and thence to the Kuskokwim and Yukon rivers and St. Michael. This was a tedious and expensive mode of transporting merchandise, but it was long preferred to the risk and uncertainty of sending sailing craft around to St. Michael through the shallow and stormy waters of Bering sea. On the eastern side of the peninsula the mountains rise abruptly from the sea, a short day's climbing transplanting the traveler from tide water into the midst of glaciers and eternal snows and scenes of alpine grandeur and solitude.

The group of islands of which Kadiak is the largest is, perhaps, at the present day the most important section of this division, being the central depot and station of the several firms engaged in the fur trade. Kadiak Island was discovered by the Russian traders as early as 1762, but was abandoned, owing to the hostile disposition of the natives, who were then quite numerous, and it was not until twenty years later that a permanent foothold was gained by Shelikhof, the founder and organizer of the Russian-American Company. For many years after Kadiak was the headquarters of that powerful corporation and the residence of the governor of all the Russian colonies on the northwest coast of America, until Baranof's ambition drove him to the eastward along the coast, where he met with English and American traders among the islands of the Alexander Archipelago, and there established himself, claiming Russian sovereignty over the coast to the southward far beyond the present boundary of Alaska.

The first missionary establishment of the Russian church on these shores also landed on Kadiak Island, and from here a few courageous apostles set out to regions then totally unknown to preach the gospel among the savage tribes. A century of uninterrupted presence of Christianizing influences among them has so transformed these natives that not a vestige of their former fierce and savage nature can now be found, and their settlements will compare favorably in neatness and domestic comfort with most of the fishing villages of northern Europe. The climatic conditions of the island are more favorable than in most other sections of Alaska, the cultivation of potatoes and turnips and the rearing of cattle being among the general industries of the people. At the creole settlement of Afognak there is quite an extensive acreage, fenced

in, under cultivation; and at the village of St. Paul, on Wood Island, and on Spruce Island these farming operations are extending every year. The crops are by no means abundant, and can not be counted upon as a certainty every year; but there is enough to add much to the comfort of life and a pleasant and wholesome variety to the dietary of the people. Experiments in sheep raising have also been made, with encouraging results, so far as the quality of the wool is concerned; but the increase in lambs is much less than in Oregon or California, and is still more diminished by the ravages of eagles and ravens. As the northern portion of the island of Kadiak and the smaller islands to the northward are timbered, the people here have facilities for ship or boat building, of which they avail themselves to the fullest extent. One or more small crafts can always be found in process of construction, principally upon orders from the prosperous white sea-otter hunters of the Shumagin Islands or for the trading firms and private traders. A deputy collector of customs stationed at Kadiak has quite a respectable list of small craft built and registered in the district.

Sea-otter parties are fitted out in nearly every village, and are frequently taken to distant hunting grounds in sloops and schooners. The old men and youths remain at home and employ their time profitably in hunting bears and trapping foxes, principally of the black and the cross variety. The salmon fishery is increasing in volume with astonishing rapidity, and furnishes labor for numerous hands, whites as well as native males and females. Codfish is found nearly everywhere in the shallow soundings of the coast, and forms a great staple of food with the people, but at present it is not exported.

The parish priest of the Russian Church located at Kadiak village has under his spiritual jurisdiction nearly the whole of this division, with the exception of the western coast of the Aliaska Peninsula and the upper portion of Cook Inlet, the latter section being confided to the care of a missionary monk located at Kenai, on the Rédoute St. Nicholas.

On the coast of the peninsula opposite Kadiak Island coal has been found, together with many indications of the existence of petroleum; but if other mineral deposits are hidden within the recesses of the mountains, they have thus far escaped the searching eye of the prospector and explorer.

The settlement of Katmai, in this vicinity, was once the central point of transit for travel and traffic across the peninsula. Three different routes converged here and made the station a point of some importance; now Katmai's commercial glory has departed, and its population, consisting of less than 200 creoles and Innuits, depend upon the sea otter alone for existence. The men could have reindeer in plenty by climbing the mountains that rear their snow-covered summits immediately behind them, but they prefer to brave the dangers of the deep and to put up with all the discomfort and inconvenience connected with sea-otter hunting, and in case of success purchase canned meats and fruits from the trading store, leaving the deer on the mountain undisturbed.

The people of two villages across the divide, in the vicinity of Lake Walker, come down to Katmai to do their shopping and to dispose of their furs, undertaking a very fatiguing tramp over mountains and glaciers and across deep and dangerous streams in preference to the canoe journey to the Bristol Bay stations. Only at long intervals a small party will proceed to Nushagak to visit the Russian missionary stationed there, to whose spiritual care they have been assigned without regard to locality or convenience.

Of the creoles embraced in the parish of Kadiak 103 are reported by the church authorities as being able to read and write in the Kadiak and a small proportion of them in the Russian language.

Northward from the Kadiak group we find a deep indentation of the coast, bounded by a lofty mountain range, with which several volcanic peaks in the westward and the peninsula in the east form the great estuary known as Cook Inlet.

When the Russian traders first penetrated into the recesses of this region under the lead of two rival companies, in 1787 and 1789, they made war upon each other. Scenes of piracy and bloodshed were enacted in swift succession for ten long years, until Baranof with his iron will and hand, settled all disputes by sending the disputants to Siberia for trial and punishment.

Historically, this whole region is one of the most interesting in all Alaska. It is also interesting to the ethnologist, from the fact that here are found the only instances of the interior Indian tribes of the Athabaskan family impinging upon the coast. The people known as Kenaitze (Kinnats or Tinnats) are strongly defined; but they are a separate people from the Eskimo inhabiting Kadiak and the seacoast adjoining. The height of the male of the Kenai tribe is greater than that of the Eskimo, and a full grown man of less than 5 feet 8 inches is rarely encountered. They are slim, lithe, and sinewy; the eyes are set straight in the head; the nose is prominent, frequently aquiline; the mouth is large, with full lips, the chin frequently receding; the skin is very perceptibly darker than that of the Eskimo; they wear their hair, which is thick and coarse, much longer than the natives of Kadiak; and the males gather it into a thick stubby braid, hanging down the back, thickly smeared with grease and sometimes powdered over with feathers and down.

At the head of the inlet and on the rivers emptying into it from the north we find these people more primitive in their manners and customs, dressing in buckskin shirts and trousers, the men and women almost alike. Many of their hunting shirts and breeches are tastefully embellished with porcupine quills and grass braiding, bead embroidery and fringes, while both nose and ears of the men are pierced for the insertion of the white shells of the dentalium, or hyqua, here called "sukli." This shell was formerly in general demand among the Indian tribes of the Territory, but now this seems to be the only section where there is a steady call for the article. The women are treated well and kindly, but they have much heavier burdens laid upon them in the line of manual labor than those imposed upon their wives by the Kadiak or Aleutian natives. The Kenaitze travel a great deal by land, and the women serve as pack animals. In their domestic architecture and economy they also differ much from the Eskimo, their houses being always erected above the ground with logs and roofed with bark, the under side of each log being hollowed out, so as to fit down tightly over the round surface of the one beneath. They build their roofs with regular rafters, pitched sufficiently to shed the rain and melting snow, and a fireplace is reserved in the center, with a small aperture directly above in the roof. The door to this structure is a low square hole at one end, large enough to admit a stooping person, and a bear skin is usually hung over it, or a plank is placed before it. The floor is generally the natural earth, while around the sides of the room, a foot or two from the ground and wide enough to allow the people to stretch out upon at night, is erected a rude stage. On this staging they lay grass mats and skins for bedding and covering. This is the most primitive style of dwelling. Those among them who have had frequent intercourses with the trading posts and villages farther down the inlet have added to their houses wings, or small box-like additions, tightly framed together, with an entrance only from the interior of the larger structure. These little additions, used as sleeping apartments and sometimes as bath rooms, are furnished with the luxury of a plank floor, and in many instances have a small window of transparent bladder or intestine.

On all the principal hunting grounds, or along the trails most frequented by the Kenaitze, are found structures similar to those above mentioned, with additions built very compact and low, which serve as places of refuge for the hunter and traveler in times of snow storm and excessive cold. A party of hunters can retire into one of these shelters and keep up quite a high degree of temperature with their own animal heat for hours, and even days, if the storm should be prolonged, and they are safe from the cold, though the air they breathe may not be of the best.

The Kenaitze are in disposition much more taciturn than their Innuit neighbors, and are more dignified in demeanor; but they are ardent hunters, spending most of their time and energy in the chase on land, where the fur-bearing animals peculiar to the country are numerous, varied, and valuable, and often make long journeys into the interior, up and through mountain defiles, and even over summits and glaciers, erecting at every convenient camping ground the temporary shelters above referred to. At localities where tribes or families meet for traffic or hunting they build up somewhat larger structures, consisting of two open sheds, with sloping roofs facing each other, allowing the inmates to warm themselves by one and the same fire. These people along the rivers and the northern portion of the inlet build birch-bark canoes, but when they get

down to the seaboard or to the Innuit settlements of the lower peninsula they buy bidarkas or skin canoes for the purpose of fishing or navigating in salt water. Wooden canoes or dugouts are not known west of the mouth of the Copper River.

The Kenaitze are expert fishermen, and certainly enjoy an abundance of piscatorial food, salmon of fine size and quality running up their rivers, and trout crowd the hundreds of lakes in their country, where they are found all through the winter and caught through the ice. The fishermen descend to tide water only when king salmon, or "chavitcha," come up from the sea in dense masses, or when schools of white whales or grampus follow up the "eulachan," or candlefish, until they are left high and dry by the receding tide and fall easy victims to the natives. The variety of native mammals is very great. Bears both brown and black—the former of great size and ferocity, frequently from 10 to 12 feet in length, strongly suggestive of the grizzly—are killed in large numbers by the hunters every year. The deer found here is apparently a larger cousin of the reindeer, the woodland caribou. Moose, single and in family groups, can be found feeding through the low brushwood and alder swamps, and mountain sheep inhabit the higher mountains, feeding upon the nutritious grasses and moss found in the clefts of mountain tops and rocky ledges. The fleece of this sheep (or goat) is surprisingly long and coarse, their skins making a favorite bedding of the natives. These natives trap the beaver on streams and lakes, the land otter not only in the interior, but on the seashore, and kill the porcupine, the whistling marmot, wolves, black and gray, the lynx, the wolverine, the marten, mink, muskrat, and a small white weasel, called here "ermine" by courtesy. Of wild fowl they have the grouse (both the white ptarmigan and the ruffled grouse), wild geese and ducks in millions during the breeding season, and the blue sand-hill crane and white swan in flocks.

From the Kenai settlements on the eastern shore of the inlet and the Kustatan village opposite, southward, the men are also sea-otter hunters, going down to Anchor Point and the Barren Islands in parties, or to the reefs of Chermaboura and Cape Douglas. The Kenaitze population proper is all located north of a line drawn from Anchor Point to the Ilyamna portage of the west coast of the inlet, south of the deep indentation of the Kenai peninsula called Chugachik or Kuchekmak Gulf. This country is settled by Innuits, who have peopled the east coast of the peninsula, and from there eastward along the mainland nearly to the Copper River. Two of the trading stations in the Kenai district are located among these Innuits at English Bay and Seldovia. Three more stations, consisting each of two rival stores, are located at Kenai (Rédoute St. Nicholas), on the river Kinik, and the village of Toyonok, or West Foreland.

The central point of all this region is Kenai, once the site of the earliest permanent settlement on the inlet, the remnants of which can still be seen. A Russian missionary is located here, and a new church is nearly completed.

At the time of the transfer of the territory Kenai was still a fortified place, with a high stockade and octagonal bastions at the salient points. Both stockade and bastions, with their primitive armament of 1½-pound falconets, have disappeared since then, but a number of new buildings have sprung up, and a thrifty colony of creoles has taken to the cultivation of potatoes and turnips on a larger scale than had ever been attempted before. Perhaps 10 or 12 acres are planted here now, and several of the families keep cattle. Some of the choicest salmon of the territory is salted here, and is barreled and shipped to San Francisco. The hunting grounds in the immediate vicinity do not yield their former abundance of valuable furs, but the presence of the missionary establishment causes a concentration of natives from all parts of the inlet at least once a year and brings considerable trade to this old station. It was on the river Kaknu, or Kenai, that the Russian mining engineer Doroshin reported the existence of surface gold in paying quantities. After laboring with a numerous party in the mountains for two seasons, at great expense to the Russian-American Company, he returned with a few ounces of the precious metal, but he could present no inducement to the corporation to proceed any farther in this enterprise. Since that time American prospectors have passed years in this region following up the Russian's tracks, but not one of them has thus far found gold enough to warrant him to work the find. In former years Kenai was also the site of a large brickyard, the only establishment

of the kind in the colony, from which all stations and settlements were supplied with the material for the old-fashioned Russian ovens or heaters.

About 30 miles down the coast from Kenai there is another settlement deserving at least a passing notice. A number of "colonial citizens," or superannuated employees of the old Russian company, were ordered to settle some fifty or sixty years ago at Ninilchik, and their descendants live there still. Each family has quite a large garden patch of turnips and potatoes, yielding enough to allow the owners to dispose of a large surplus to traders and fishermen. They have quite a herd of cattle, and the women actually make butter; but they are not sufficiently advanced in farming lore to construct or use a churn, and the butter is made in a very laborious manner by shaking the cream in bottles. They also raise pigs and keep poultry, but on account of the hogs running on the seashore digging clams and feeding upon kelp, and the chickens scratching among fish bones and other offal, both their poultry and their pork are fishy to such an extent as to be made unpalatable. The young men of the settlement go out to hunt the sea otter at Anchor Point, or even lower down the coast.

The whole region about Cook Inlet is wooded, the forest being here and there interspersed with marshy tundras; but everywhere along the coast the timber is small and stunted, being of larger dimensions only in the interior.

In the vicinity of Anchor Point, on Kuchekmak Gulf, and on Graham's or English Harbor, extensive coal veins appear along the bluffs and come to the surface. The Russian-American Company jointly with a San Francisco firm worked here for years to develop the mines and obtain a product good enough for the use of steamers and engines, but after sinking a large capital the enterprise was abandoned before the transfer of the territory took place. A few remnants of the extensive buildings erected in connection with these mining operations still remain on the north shore of English Bay.

The easternmost section of this division comprises the coast bordering upon the Gulf of Chugatch, or Prince William Sound, and from there to Mount St. Elias; this is essentially an alpine region. The whole coast between Cape St. Elizabeth in the west and the mouth of Copper River in the east is deeply indented with coves and fiords, and towering peaks rise abruptly from the sea. Nearly every valley and ravine has its glacier, some of the latter being among the most extensive in the world. In Port Valdez, at the northern extremity of the sound, a glacier exists with a face 15 miles in length at the seashore, while its downward track can be traced almost to the summit of the alps. Huge icebergs drop off its face with a thundering noise almost continually and drift out to sea, and the whole extensive bay is covered with small fragments, making it inaccessible to even boat navigation, and consequently a safe retreat for seals, which sport here in thousands. Port Fidalgo in the east and Port Wells in the west also have tremendous glaciers, and another glacial formation forms the portage route between Chugatch Bay and Cook Inlet. Though covered with a dense forest to a height of 1,000 feet from the sea level, these mountains are comparatively poor in animal life, and support in small settlements only a very limited population scattered along the coast and islands. The timber is nearly all spruce, some of it of extraordinary size, but no practical use has been made of this material since Baranof established a shipyard in Resurrection Bay, on the Kenai Peninsula, and with the aid of English shipwrights constructed a few small vessels. One of these crafts was a three-master, and boasted the title of frigate, though it measured only 100 tons.

Traces of the Russian woodman's ax are still plainly visible along the western coast of the sound and on Montague Island, and the huge logs still lie where they were felled in anticipation of an industry that was not developed.

The principal fur-bearing animals of this section are the black and the brown bear, otter, marten, and mink, but on the eastern side of Nuchek Island there is quite an extensive sea otter hunting ground, which supports two large trading stores on that island. Whales are plentiful in these waters, but the natives are not bold enough to attack them. Cod fishing banks exist in a few localities, and all the rivers and streams have their annual run of salmon. In the early times of the Russian régime Nuchek, which was then called Rédoute Saint Constantine, was quite an

important trading center, being visited by Thlinket tribes from the coast to the eastward as far as Bering Bay, and also by the Copper River Indians of the Tinneh family. This traffic, to a certain extent, still exists, but not in the old dimensions. There is every reason to believe that the Copper River people have much decreased in numbers, and that they find other outlets for their trade to the northward on the Yukon or the Tanana.

Under the protection of the Russians the Eskimo race here occupied the coast as far eastward as Kaiak Island and Comptroller Bay, but in late years the Thlinket have gradually advanced westward, first mixing with the Eskimo and then absorbing and superseding them, until at the present day they are established in predominant numbers even west of the mouth of the Copper River.

The number of sea-otters sold at the Nuchek stores every year does not exceed 150, and are all killed between the islands of Nushegak and Kaiak. The whole Eskimo population of this secluded district is only about 500, and, as they are poor, they will most probably remain in this seclusion, which is broken but once or twice a year by the arrival of the trading schooner. They have food in plenty, such as it is, consisting of seal blubber, salmon, the meat of the marmot, porcupine, and bear, varied occasionally by the welcome addition of mountain sheep, an animal that is found over all this alpine region, and is as persistently and skillfully hunted by the natives as is the chamois in Switzerland and the Tyrol. The meat of this mountain sheep, or goat, is in every way equal to the finest tame mutton, but by the time one of the native hunters brings a carcass down from the mountains to the seacoast or the trading store the meat is sadly bruised and lacerated, and presents rather an uninviting appearance. Foxes, of course, are plentiful here, as everywhere in Alaska, in two or three varieties, some very fine specimens of silver-gray being brought down to the coast by the Copper River Indians. No mineral deposits have been discovered in these mountains, with the exception of pure native copper, specimens of which have been secured from Copper River ever since the Russians first made their appearance there, but repeated attempts by Russians, and later by Americans, to locate the source from whence these specimens came have always resulted in failure. An American prospector who lived with those Indians for two years reports that he failed to discover copper or gold in paying quantities anywhere in that region, but his individual opinion is not sufficient to deny the existence of copper deposits, of which so many specimens have been procured; and the ultimate location of these deposits is only a question of time and energy.

Of the features of the coast between Copper River and Mount St. Elias but little is known, but it is evidently a narrow table-land between the high mountains and the sea, well timbered, and traversed by numerous shallow streams that take their origin in the glaciers and eternal snows. The natives describe it as an excellent hunting ground. The island of Kaiak is undoubtedly the point where Bering first approached the American continent, and upon the southern point of which he bestowed the name of Cape St. Elias. It is not permanently inhabited, but hunting parties from the mainland sometimes remain here for many months at a time.

The Eskimo of this section partake of the same characteristics with the people of Kadiak and the peninsula.

Timber exists here in the greatest abundance. The dwellings of the people are generally under ground, according to Innuit custom, but where the Thlinket or Kolosh race has mixed with them and gained supremacy the mode of architecture changed at once to substantial log structures entirely above ground, generally with a plank platform running along the entire front, on which the inmates assemble in fine weather, and sit upon their haunches, wrapped in greasy blankets, smoking and staring stupidly into vacancy. At Nuchek there is a Russian chapel, but it is eight or nine years since a priest has made his appearance there. A creole reads prayers every Sunday in the chapel, which is kept in excellent repair with the aid of donations from all the surrounding villages. It is touching to observe the constancy and faith of these poor people, who have gathered at this central point from a circuit of 100 miles every spring for the last nine years in the expectation of seeing a priest come at last to give them his blessing and to solemnize the marriages that have been contracted during this long interval. Baptism can be performed by the church reader under the rules of the Russian Church.

I append a tabulated list of the settlements and the population of the entire peninsula division, as follows:

KADIAK DIVISION.

Settlements.	Location.	Total.	White.	Creole.	Eskimo.	Athabaskan.	Thlinket.	Settlements.	Location.	Total.	White.	Creole.	Eskimo.	Athabaskan.	Thlinket.
Mitrofania	Aliaska Peninsula	22	....	22	.....	....	...	Shilakh	Kenai Peninsula	44	....	....	.....	44	...
Kaluiak	.....do	30	....	1	29	....	...	Kanai Rédoute	.....do	44	2	42	.....	....	...
Sutkhoon	.....do	25	....	....	25	....	...	Titukilsk and Nikishka.	.....do	57	....	....	.....	57	...
Kuyukak	.....do	18	....	....	18	....	...								
Katmai	.....do	218	....	37	181	....	...	Kultuk	.....do	17	....	....	.....	17	...
Kukak	.....do	37	....	....	37	....	...	Knakatnuk	Kinik River, Cook Inlet.	57	1	1	.....	55	...
Ashivak	Cape Douglas	46	....	6	40	....	...								
St. Paul	Kadiak Island	288	20	253	15	....	...	Zdluiat	.....do	16	....	....	.....	16	...
Lesnova	Wood Island	157	2	56	99	....	...	Nitakh	.....do	15	....	....	.....	15	...
Yelovoi	Spruce Island	78	....	78	.....	....	...	Kinik	.....do	46	....	....	.....	46	...
Oozinkie	Kadiak Island	45	....	45	.....	....	...	Sushetno (first village).	Cook Inlet	44	....	....	.....	44	...
Afognak (two villages).	Afognak Island	339	....	195	144	....	...	Sushetno (second village).	.....do	46	....	....	.....	46	...
Ooganok (two villages).	Kadiak Island	73	....	....	73	....	...	Toyonok station and village.	.....do	117	2	6	.....	109	...
Ooiak	.....do	76	....	....	76	....	...								
Karljk	.....do	302	1	24	277	....	...	Kustatan	.....do	65	....	....	.....	65	...
Athiok	.....do	114	....	....	114	....	...	Chenega	Prince William Sound.	80	....	....	80	....	...
Ayakhtalik	.....do	101	....	4	97	....	...								
Kaguiak	.....do	109	1	6	102	....	...	Kanikhluk	.....do	54	....	....	54	....	...
Three Saints Bay	.....do	7	....	4	3	....	...	Tatikhlek	.....do	73	....	....	73	....	...
Old Harbor	.....do	160	....	5	155	....	...	Nuchek	.....do	74	3	11	60	....	...
Orlova	.....do	147	....	8	139	....	...	Ikhiak and Alaganu.	Mouth of Copper River.	117	....	....	117	....	...
Chiniak village	.....do	24	....	....	24	....	...								
Killuda	.....do	36	....	....	36	....	...	Cape Martin	.....do	7	1	....	.....	....	6
Alexandrovsk	Kenai Peninsula	88	1	12	75	....	...	Atn h villages	Copper River	250	....	....	.....	250	...
Yalik	Eastern Coast Kenai Peninsula.	32	....	....	32	....	...	Chilkhaat villages.	Comptroller Bay	170	....	....	.....	....	170
Seldovia and Ostrovki.	Kenai Peninsula	74	....	38	36	....	...	Yaktag villages	Foot of Mount St. Elias range.	150	....	....	.....	....	150
Laida	.....do	29	....	....	.....	29	...	Total		4,352	34	917	2,211	864	326
Ninilchik	.....do	53	....	53	....	....	...								
Kussilof	.....do	31	....	....	.....	31	...								
Chkituk and Chernila.	.....do	50	....	10	.....	40	...								

The superficial area of the Kadiak district is approximately 70,884 square miles; the inhabitants, numbering 4,352, would give us a ratio of 1 inhabitant to 16¼ square miles. The ratio of civilized population (white and creole) is 1 to 74½ square miles.

THE SOUTHEASTERN DIVISION.

The narrow strip of coast line from Mount St. Elias to Portland Canal, a strip that was patched upon the solid body of the Russian possessions on this continent through the ambition of Baranof, differs in all its characteristics from the bulk of Alaska, partaking essentially of those of the coast of British Columbia and the islands adjoining. Though Baranof, or rather the company which he represented, at the beginning of the present century was powerful enough not only to establish, but to maintain possession of the narrow belt between the mountains and the sea, he was never able to extend the Russian possessions into the interior where the outposts of the Hudson Bay Company were already located, and as the successor of the Russians the people of the United States have shut off the British possessions from the seacoast for a distance of nearly 500 miles.

This whole division is densely wooded and exceedingly mountainous in its formation; the coast is deeply indented with bays and fiords, and for two-thirds of its length is sheltered by the

numerous islands of the Alexander Archipelago. The forests, impinging as they do upon the seacoast everywhere, are easily accessible, and will be of the greatest value in the future either as fuel or as building material. The Alaska spruce is the prevailing forest tree, but in the southern section of the division the yellow cedar, the most valuable of all the northern trees, exists in considerable quantities. The wood of this tree has always been an article of export to a limited extent, and it is purchased by the cabinetmakers of the Alaska coast at the present day: but the extent to which this industry might be developed is not yet known. Large bodies of this timber are found farther south in the adjoining British possessions. Coal has been discovered on many of the islands and on the mainland, but no practical use has thus far been made of the discoveries. An extensive vein of bronze-copper was opened on Prince of Wales Island by a British Columbian firm, but for some reason unknown the enterprise languishes. Discoveries of gold-bearing quartz have been made on Baranof Island, in the immediate vicinity of Sitka, only since the transfer of the territory, and for a time quite an excitement was created; but now these ledges are scarcely worked at all, being simply held by the owners for further developments, or until some process can be discovered for working with profit the peculiar grade of ore existing there. In the meantime surface gold was discovered on the peninsula between the inlets of Takoo and Chilkhat. The mining population of Sitka, and, to a great extent, that of the Wrangell and the Cassiar country, was drawn away to the new discoveries, where they are now engaged with apparent success. Veins of quartz have also been located in the same locality; and with the undaunted prospector throughout all this region, in a few years more the mining resources of southeastern Alaska will be fully known.

Next in importance to the mining industry stands the fur trade, once the sole foundation of the country's prosperity. From the silver and the black fox, the marten, and the land otter the most valuable furs are secured by the natives, together with skins of the black and the brown bear, a limited quantity of beaver, and a few sea-otter. Owing to excessive competition the prices paid for these furs are abnormally high, and the profits from the trade must be correspondingly small.

Salmon, halibut, and herring crowd all the waters of the seacoast, as well as those of the interior channels of the archipelago, and two or three canning and salting establishments have been in operation for some years. The oil procured from herring and dogfish and shark finds a ready market. A few small sawmills furnish rough lumber for local consumption, and a few small craft, including one steamer of 80 tons burden, ply over the sheltered inland waters and as far north as Bering Bay on the open coast. The natives on many of the islands make quite a profitable business of killing hair seals for their hides and the oil rendered from the blubber.

The climate of this division, especially from Cross Sound to the southern boundary, is very peculiar. The temperature is not as low as might be expected in this latitude, thermometrical observations extending over nearly fifty years presenting a minimum of only 4° below zero, while the maximum reached + 87°. This, however, occurred but once during the period mentioned. The mean annual temperature derived from all these observations is 43° 28′.

The rainfall statistics, extending over the same period, show a mean annual precipitation of over 80 inches, and several of the annual records are above 90, while one reaches 103. The number of days on which rain fell during the period referred to averaged 165 per annum, and of snowfall 33; but during several years the rainy days numbered as high as 250 and even 264 a year. The highest number of days on which snow fell here was 47. This enormous precipitation makes it plain that, in spite of the comparatively high temperature, the climate of southeastern Alaska can not be called an agreeable one or one that would hold out a prospect of success to agricultural immigrants. Vegetable gardens, however, have been successfully cultivated all over this district, wherever white men settled who were willing to bestow the necessary labor upon this way of ameliorating their daily fare. Potatoes were found among the natives of this region by the very first English and American visitors, especially among the Hyda tribes, and at present they are freely offered for sale by the natives wherever white people congregate for mining or trading. Owing to the rugged and mountainous formation of the country, and the thick undergrowth making the forest almost impenetrable, the keeping of cattle

is surrounded with great difficulties, and hay is not easily cured during the few sunny days of which this section can boast.

Nearly all the natives inhabiting the southeastern division are of one kin—the Thlinket tribe, or "Kolosh," as they were called by the Russians. Only at the southern portion are found a few settlements of the Hyda tribe from British Columbia. When the Russians first came to the Alexander Archipelago the natives offered a stubborn resistance to their permanent establishment. The first blockhouse or station erected by Baranof at old Sitka, was taken by surprise and all the inmates put to death by the combined Sitka and Stockin tribes, and about the same time the Thlinket of Bering Bay or Yakutat fell upon the settlement established there, killing the inhabitants and carrying off a few women into captivity. About this time, also, two large sea-otter hunting parties, consisting of Innuits, under the leadership of Russians, were surprised and almost annihilated by the Kolosh.

Undaunted by these disasters, Baranof drove the native warriors from their fortified position on the site of the present town of Sitka and established himself there, making that point the headquarters of the great Russian Fur Company. From that time forth the Thlinket only indulged in an occasional robbery or murder of isolated hunters, but no cordial intercourse was ever established between them and their conquerors. The business between them was carried on in a cautious manner, highly suggestive of a state of seige. The Russian priests made very little impression upon the warlike pagans, who only occasionally, for the consideration of a present, consented to submit to the ceremony of baptism.

As late as 1855 the Sitka Indians attacked the Russian fortifications, an action of several days resulting, during which quite a number were killed and wounded on both sides, but the difficulty was finally settled by treaty.

At that time the town of Sitka was thoroughly fortified with numerous bastions and batteries mounting between 60 and 80 cannon of various calibers. The most important of the batteries was located about the mansion of the chief manager of the Russian-American Company, which was perched upon a steep, rocky elevation, and is still known as "the castle." Here 17 cannon (12 and 24 pounders) were planted and kept constantly loaded. Every male inhabitant of the Russian settlement of Sitka had his station assigned to him in case of attack by the natives, and all employees were drilled occasionally in the manual of arms, etc. The military garrison, consisting of 180 soldiers of the Siberian battalion, mounted guard regularly, with sentries stationed at the various gates in the stockade.

For nine years after the transfer of the Russian possessions to the United States a military post was maintained here, consisting at first of nearly 250 men, but the number was gradually diminished, and the last troops were withdrawn in 1876. A few difficulties arose during this time between the troops and the Indians of Sitka and one or two of the more distant tribes, but they were generally adjusted by arbitration and a mere display of readiness to fight. A United States man-of-war now (1880) does police duty at Sitka, patrolling occasionally the interior channels of the Alexander Archipelago. It is safe to predict that the mere presence of some armed force in this section will always be sufficient to keep in check the naturally warlike and arrogant Thlinket.

Since the transfer of the Territory the town of Sitka has continued to be considered as the most important point in Alaska, and whatever display there has been of military or civil power on the part of the United States was made here. The collector of customs for the district of Alaska resides at Sitka and is unable to communicate with his deputies in the west except by way of San Francisco.

For thirty or forty years previous to the acquisition of Alaska by the United States the Sitka settlement contained a number of schools and churches, the latter comprising the cathedral of the diocese, two smaller Russian chapels and a Lutheran Church for the use of Germans, Swedes, and Finlanders in the employ of the Russian company. Of the schools one was for the sons of the higher officers of the company, under the ambitious name of "Colonial Academy," one a boarding school for girls of the same class, and two other schools for the children and orphans of the lower grades of employees and laborers.

For some time Sitka was also the site of a theological seminary of the Russian Church. All these establishments, with the exception of the cathedral, have been discontinued, and at present the only efforts in the field of education are made by missionaries and teachers sent out by the Presbyterian board of missions, with some pecuniary assistance of the naval authorities at Sitka. Mission schools have been located at Chilcoot, Hoonyah, Wrangell, and at Shakan, on Prince of Wales Island. At Wrangell there is also an industrial home for native girls, maintained by the Presbyterians, and the chapel and the parsonage of the Roman Catholic Church. Concerning these missionary establishments, the Rev. Sheldon Jackson, D. D., has furnished the following statistics:

The first school at Wrangell was established in 1877 and placed in charge of a lady teacher. In 1878 a home for girls was added to the establishment, and in the season of 1880 and 1881 this latter establishment contained 30 inmates, while the school had an average attendance of 60.

At Sitka a school was opened in April, 1878, and kept open with varying success until in April, 1880. An attendance of 130 (grown people and children) was reported.

One of the naval officers stationed at Sitka introduced upon his own responsibility a system of compulsory education, appointing regular truant officers; each child was labeled, and if found on the streets during school hours was arrested, and the head of the household to which he or she belonged was fined or imprisoned. This extraordinary and arbitrary measure worked so well that the "average attendance" was suddenly forced up to between 230 and 250—one day reaching 271—a result highly gratifying to the Presbyterian teachers, whatever objections the public at large may have to this modus operandi on constitutional grounds. The school above mentioned was for the Indians alone. For the benefit of the creole children a school was established in 1879, with the assistance of the naval authorities, who furnished a teacher and interpreter in the person of an educated creole lady, who was rated as an "able seaman." This school had an average attendance of from 45 to 55 children, who were instructed in the English language and primary branches.

In the summer of 1880 a Christian Indian woman of the Tongas tribe was sent to open a school among the Chilkats at the head of Lynn Channel, and here, later, buildings were erected at that point by the Presbyterian board of missions, and a competent teacher installed, who reports an average attendance of 75 pupils.

A school was also established among the Hoonyah tribe on Cross Sound; the teacher reports 70 pupils.

At the southern end of Prince of Wales Island, on Cordova Bay, a chief presented a house to the Presbyterian mission, and a school was opened, with an average attendance of 80 pupils.

At Shakan, on the north end of Prince of Wales Island, a small school has been opened and placed in charge of a native teacher and his wife, both former pupils of the Wrangell school.

We append a tabulated list of the settlements and population of the southeastern division, as follows:

SOUTHEASTERN DIVISION.

Settlement.	Location.	Total.	White.	Creole.	Thlinket.	Hyda.	Settlement.	Location.	Total.	White.	Creole.	Thlinket.	Hyda.
NATIVES.							NATIVES—cont'd.						
Chilkat tribe.							*Auk tribe.*						
Yondestuk	Chilkat River and Bay	988	....	....	171	....	Village	Stephens Passage	640	....	....	290	....
Kutkwutlu	do		....	....	125	....	Do	Admiralty Island		....	....	300	....
Kluckquan	do		....	....	565	....	Do	Douglas Island		....	....	50	....
Chilcoot	Chilcoot River		....	....	127	....	*Takoo tribe.*						
Hoonyah tribe.							Tokeatl's village	Takoo River and Inlet	269	....	....	26	....
Koudekan	Chichagof Island	908	....	....	800	....	Chitklin's village	do		....	....	113	....
Klughuggue	do		....	....	108	....	Katlany's village	do		....	....	106	....
Khootznahoo tribe.							Fotshou's village	do		....	....	24	....
Augoon	Admiralty Island, Hoods Bay.	666	....	....	420	....	*Stakhin tribe.*						
Scutsoon	do		....	....	246	....	Shustak's village	Etholin Island	317	....	....	38	....
Kehk tribe.							Kash's village	do		....	....	49	....
Klukwan	Kuprianof Island	568	....	....	261	....	Shakes's village	do		....	....	38	....
Village	do		....	....	82	....	Towayat's village	do		....	....	82	....
Do	Koo Island		....	....	100	....	Kohltiene's village	Stakhin River		....	....	28	....
Do	Port Houghton		....	....	50	....	Hinauhan's village	do		....	....	31	....
Do	Seymours Channel		....	....	75	....	Kadishan's village	do		....	....	27	....
							Shallyany's village	do		....	....	24	....

SOUTHEASTERN DIVISION—Continued.

Settlement.	Location.	Total.	White.	Creole.	Thlinket.	Hyda.
NATIVES—cont'd.						
Prince of Wales Island tribe.						
Kouyou	Prince of Wales Island, west coast.	587	....	....	60	....
Hanega	do		....	....	500	....
Klawak	do		....	....	27	....
Tongas tribe.						
Village	Island mouth Portland Canal.	273	....	....	173	....
Cape Fox	Prince of Wales Island		....	....	100	....
Sitka tribe.						
Sitka, Indian village.	Baranof Island	721	....	....	540	....
Silver Bay			....	....	39	....
Hot Springs			....	....	26	....
Indian River			....	....	43	....
Old Sitka			....	....	73	....
Yakutat tribe.						
Scattered villages between Cape Spencer and Bering Bay.	Coast of mainland	500	....	....	200	....
Yakutat	Bering Bay		....	....	300	....
NATIVES—cont'd.						
Hyda tribe.						
Kassan and Skowl	Prince of Wales Island	788	....	....	.....	173
Kliuquan	do		....	....	.....	125
Kolanglas	do		....	....	.....	62
Howakan	do		....	....	.....	287
Shakan	do		....	....	.....	141
Total native		7,225	....	....	6,437	788
WHITES AND CREOLES.						
Wrangell	Etholin Island	106	105	1	.....	....
Shuck	Stephens Passage	10	10	....	.....	....
Soundun	Holkhan Bay	10	10	....	.....	....
Shakan	Prince of Wales Island	8	5	3	.....	....
Old Sitka	Baranof Island	6	6	....	.....	....
Sitka	do	376	157	219	.....	....
Kassan	Prince of Wales Island	7	....	7	.....	....
Total white and creole.		523	293	230	.....	....
Grand total		7,748	293	230	6,437	788

The superficial area of this island division is, as nearly as it can be computed from the limited data at my command, about 28,980 square miles. This would give a density of population of 1 inhabitant to nearly 4 square miles. The ratio of civilized (white and creole) population was, in 1880, 1 to 55½ square miles. This element is now probably three times as numerous, or 1 to 19 square miles. The Thlinket and Hyda, however, are very susceptible of civilization, and are rapidly advancing in their social status, thanks to the efforts of missionaries and the contact with Caucasian miners and traders.

Recapitulation of the population of Alaska.

Divisions.	Total.	White.	Creole.	Eskimo.	Aleut.	Athabaskan.	Thlinket.	Hyda.
Arctic	3,094	.....	.....	3,094	.....	.....	.....	.....
Yukon	6,870	18	19	4,276	.....	2,557	.....	.....
Kuskokwim	8,911	3	111	8,036	255	506	.....	.....
Aleutian	2,451	82	479	.....	1,890	.....	.....	.....
Kadiak	4,352	34	917	2,211	.....	864	326	.....
Southeastern	7,748	293	230	.....	.....	.....	6,437	788
Total	33,426	430	1,756	17,617	2,145	3,927	6,763	788

The earliest actual count of any Alaskan people now on record was made by Delarof (an agent of the Shelikhof Company) in the year 1792. This count comprised all the villages on Kadiak Island and the settlement of Yukatmak (Katmai), on the Aliaska Peninsula. The number then given was 6,510 of both sexes, as against Shelikhof's estimate of 50,000, made only six years before that date. Four years later, in 1796, Baranof counted 6,200 inhabitants on Kadiak Island and the opposite coast of Aliaska Peninsula.

On the Aleutian Islands Panof, a trader, claimed to have counted 1,900 inhabitants as early as the year 1781, but this was only a verbal statement transmitted by others. In 1792 Captain Sarychef, of the Billings exploring expedition, who had been instructed to enumerate the natives, reported the population of the Aleutian Islands as 2,500 of both sexes, but the result of an actual

count made by order of the imperial chamberlain, Rezanof, resulted in the number of 1,942, approximating closely the estimate of Panof, made over twenty years before.

At the time of Baranof's retirement from the management of the Russian colonies in America, his temporary successor, Captain Hagemeister, of the Russian navy, ordered an enumeration of the natives. This count included, of course, only those tribes over whom the Russian-American Company had absolute control. Of this partial census we have two returns, differing slightly in the totals. One was first published in the report of an imperial inspector, Kostlivtzof, who dated it 1818, which reads as follows:

Native population of Russian colonies in America in 1818.

Districts.	Total.	Males.	Females.
Kadiak	3,430	1,484	1,769
		142	35
Aliaska Peninsula	869	402	467
Kenai (Cook Inlet)	1,471	723	748
Chugach (Prince William Sound)	477	172	188
Oughalentse (Prince William Sound)		51	66
Mednovtze (Copper River)	567	294	273
Fox Islands (Aleutian)	1,469	463	559
Pribilof Islands (Aleutian)		188	191
Aleutian		42	26
Total	8,283	3,961	4,322
Russians	354	344	10
Creoles	256	147	109
Aggregate	8,893	4,452	4,441

No estimate of the Thlinket or Kolosh accompanied this document.

The other return of the same enumeration was published by Tikhménief in his Historical Review, and dated 1819. It is as follows:

Native population of Russian America in 1819.

Districts.	Total.	Males.	Females.
Kadiak district	3,252	1,483	1,769
Aliaska Peninsula	869	402	467
Chugach (Prince William Sound)	477	172	188
Oughalentse (Prince William Sound)		51	66
Fox Islands (Aleutian)	1,748	464	559
Pribylof Islands (Aleutian)		188	191
Aleutian laborers at Sitka		285	91
Kenai (Cook Inlet)	1,471	723	748
Mednovtze (Copper River)	567	294	273
Total	8,384	4,062	4,322
Russians	391	.....	.....
Creoles	244	.....	.....
Thlinket or Kolosh (estimate)	5,000	.....	.....
Aggregate	14,019	.....	.....

The discrepancies between these two returns are small, and are easily accounted for by the difference in date.

Three years later, in 1822, another return placed the native population under control of the company at 8,286.

Next in chronological order comes a population return of the Russian colonies in America, forwarded by Chief Manager Baron Wrangell, under date of January 1, 1825, as follows:

Islands.	Total.	Males.	Females.	Islands.	Total.	Males.	Females.
Kadiak Island	2,819	1,351	1,468	Tigalda Island	52	24	28
Aliaska, coast opposite	190	99	91	Oogamok Island	49	19	30
Ookamok Island	88	51	37	Aliaska, adjoining coast	207	118	89
Chugach, Prince William Sound	1,563	782	781	Oonimak Island	99	45	54
Kenai, Cook Inlet	1,299	636	663	Sannakh Island	101	43	58
Nushegak, Bristol Bay	671	306	365	Ounga Island	50	25	25
Iliuliuk, Oonalashka Island	333	152	181	Atkha Island	130	63	67
Chernovsky, Oonalashka Island	43	21	22	Chugal Island	62	29	33
Borka, Oonalashka Island	27	11	16	Adakh Island	193	104	89
Oumnak Island	137	62	75	Amchitka Island	42	14	28
Oonalga Island	11	3	8	Attoo Island	97	45	52
Akutan Island	36	18	18	Total	8,481	4,102	4,379
Akoon Island	139	59	80				
Avatanok Island	43	22	21				

This count also includes only the natives under control of the company, ignoring the Thlinket, and must be ascribed to Veniaminof during the first year of his sojourn on the Aleutian Islands. According to this statement the aggregate of Aleutian tribes was then 1,850 of both sexes, while that of Kadiak and the adjoining coast of the Aliaska Peninsula was 3,097, figures which do not agree with a comparative statement of population of these two sections published in 1830, and also ascribed to Veniaminof, as follows:

Years.	Kadiak and Aliaska.	Years.	Aleutian Islands.
1792	6,510	1781	1,900
1806	3,944	1806	1,898
1817	4,198	1813	1,508
1821	3,649	1825	1,478
1825	3,396	1830	1,460

From this it will be seen that the aggregate population of the two districts in 1825 was nearly the same as that given in the preceding table of Wrangell, though the distribution differs somewhat.

In the year 1831 the same priest, Veniaminof, made a careful count of the Aleutian people, which may be considered as authentic. The result of his investigations was a tabular statement, arranged by villages and islands, giving also the number of houses and canoes in each settlement. I can not do better than republish it in full:

Census of Oonalashka District in 1831.

Islands.	Villages.	Inhabitants.			Houses.	Canoes.	Islands.	Villages.	Inhabitants.			Houses.	Canoes.
		Male.	Female.	Total.					Male.	Female.	Total.		
Oonalashka	Iliuliuk	90	106	196	27	15	Oumnak	Recheshnaia	38	45	83	13	12
Do	Natuikinsk	6	9	15	2	2	Do	Tulik	11	15	26	3	6
Do	Pestriakof	18	21	39	5	4							
Do	Vesselovsky	7	8	15	3	3	Total Oumnak (two villages)		49	60	109	16	18
Do	Makushin	15	20	35	6	5							
Do	Koshigin	18	23	41	8	9							
Do	Chernovsky	20	24	44	4	10	Akoon	Artelnaia	16	16	32	7	9
Do	Imagnak	15	17	32	4	2	Do	Recheshnaia	19	18	37	5	8
Do	Kalekhta	6	8	14	2	2	Do	Srednaia	7	9	16	2	4
Do	Bobrovskaia	21	20	41	4	6							
Total Oonalashka (ten villages)		216	256	472	65	58	Total Akoon (three villages)		42	43	85	14	21

Census of Oonalashka District in 1831—Continued.

Islands.	Villages.	Inhabitants.			Houses.	Canoes.	Islands.	Villages.	Inhabitants.			Houses.	Canoes.
		Male.	Female.	Total.					Male.	Female.	Total.		
Pribylof	St. George and St. Paul.	88	94	182	.....	.....	Aliaska Peninsula	Morshevol	16	29	45	7	6
							Do	Belkovsky	49	53	102	10	16
Borka	Sidanak	17	27	44	6	7	Do	Pavlovsk	28	31	59	8	9
Oonalga	Oonalga	10	13	23	3	4	Total Aliaska Peninsula (three villages).		93	113	206	25	31
Avatanok	Avatanok	24	25	49	5	9							
Akutan	Akutan	6	7	13	2	1							
Tigalda	Tigalda	38	59	97	6	14							
Oonimak	Shishaldin	38	53	91	2	4							
Ounga	Delarof	52	64	116	13	15	Scattered at Sitka and elsewhere.		10	18	28	.....	.....
Total small islands (nine villages).		273	342	615	37	54	Grand total of district.		683	832	1,515	157	182

This table gives us the proportion of nearly 10 inhabitants to each house, 8 inhabitants to every canoe, and 1 canoe to between 3 and 4 male inhabitants (about 1 canoe to every 2 adults). The excess of females over males was nearly 10 per cent.

In the year 1835 the same priest, then stationed at Sitka, made a close estimate of the Kolosh or Thlinket of southeastern Alaska, which seems remarkably accurate in its total, though some of the villages enumerated by Veniaminof are not known to us now. He divided the Thlinket into sixteen villages or clans, as follows:

Estimate of Kolosh in 1835.

1. Yakutat	150	10. Kuyutzk	150
2. Ltuia or Avetzk	200	11. Henu (Hunyah or Hanega?)	300
3. Icy Strait (Cross Sound)	250	12. Stakhin	1,500
4. Chilkat (Lynn Canal)	200	13. Tongass	150
5. Akut (Auk)	100	14. Kaigan (Hydan)	1,200
6. Sitkha	750	15. Chassin	150
7. Takoo	150	16. Sanakhan	100
8. Hootznoo	300		
9. Kehk	200	Total	5,850

In 1839 Veniaminof made another estimate, including the total population of the country now called Alaska. He wrote as follows:

The northwestern part of America from Bering Strait to the meridian of Mount St. Elias, or 141° west of Greenwich, and all the islands situated along the coast of America farther to the eastward, and a portion of the mainland, to a distance of 50 versts from the seashore, down to longitude 130° and latitude 50°, belongs to Russia, and is bounded in the east by the British Possessions. Our America is peopled by a multitude of tribes and races, the number of which is, of course, unknown to us, but as far as the names of tribes in our part of America have been ascertained they are as follows:

1. The Kolosh, inhabiting the islands and the narrow strip of the American continent at the extreme southeastern limits of the Russian possessions, whose number is now about	5,000
2. The Oughalentze, living near Mount St. Elias, numbering not more than	150
3. The Mednovtze, who live on Copper River, to the number of	300
4. The Kolchane, living far away in the interior of the continent, near our boundaries; their number is unknown.	
5. The Chugach, living on the gulf of the same name, numbering now	471
6. The Kenaitze, living on the shores of the Gulf of Kenai, numbering	1,628
7. The inhabitants of the southern shore of the Aliaska Peninsula, numbering	1,600
8. The Aglegmute, on the northern shore of Aliaska Peninsula, numbering	402
9. The Kadiaks or Koniagi, living on the island of Kadiak, numbering	1,508
10. The Oonalashkans or Aleuts, inhabiting the Fox Islands and a portion of the Aliaska Peninsula, numbering	1,497
11. The Atkhans, or Atkha Aleuts, inhabiting the Andreican of islands, numbering	750

12. The Kuskokwims, living on the river Kuskokwim, which empties into Bering Sea, numbering about 7,000

13. The Kvikhpaks, Kaitentze, Malegmute, and other tribes inhabiting the shores of Bering Sea and the rivers emptying into the same, and also the coast of the Northern Ocean, whose number can not be less than all those above mentioned together.

To this native population of Russian America we must add Russians living in the various settlements to the number of 706

Creoles—that is, the offspring of Russians from native American mothers—who form the foundation for a class of American citizens of Russia, numbering 1,295

Consequently our total population in America may be given as follows:

Known and counted	10,313
Known, but not counted	12,500
Estimated only	17,000
Making a total of	39,813

Though objection may be made to certain details of this estimate as incorrect, the total comes sufficiently near to our latest data to convince us that Veniaminof had then a better conception of the population of Russian America than the compilers of the official reports of the Russian-American Company exhibited during many succeeding years.

Next in chronological order we find an enumeration of the Thlinket and Hyda tribes of Alaska, made under the auspices of Sir James Douglas, of the Hudson Bay Company, in the year 1839, when the latter firm had obtained from the Russian-American Company a ten years' lease of the continental coast between Lynn Canal and the southern boundary. This document was never printed, but has been preserved in the archives of the Hudson Bay Company and in Sir James Douglas's private papers. Its figures are somewhat in excess of Veniaminof's estimate, but approach more closely to our most recent enumeration. The names of tribes and clans as given by Douglas can not all be identified now, but the whole table, circumstantial as it is in its classification of adults and children of both sexes and even of slaves, bears the imprint of authenticity. Subjoined I give it in full as copied from the manuscript journal:

Census of native tribes of Russian America between latitude 59° and 54° 40′ north, exclusive of the Sitka tribe on Baranof Island, in 1839.

Traders' names of tribes.	Native tribal names.	Locations.	Total	Adults.		Children.		Slaves.	
				Men.	Women.	Boys.	Girls.	Male.	Female.
Chilcat	Chilkhaat	Lynn Canal	498	107	116	71	66	42	36
Cross Sound	Hoonyah	Cross Sound	782	258	234	108	88	40	54
Auke	Auke	North of Takoo River	203	72	61	35	31	2	2
Tako Samdan	Tako, Samdan, Sitka	Takoo River, Sitka River.	493	127	110	71	66	59	60
Hoochenoo	Hootznoo	Hoods Bay	729	247	240	85	76	40	41
Hanega	Henega	Prince of Wales Island	269	82	80	29	27	27	24
Kake	Kehk	Kehk Archipelago	333	109	106	70	64	21	20
	Stakhin:								
Stikeen	Liknaahutly	Stakhin River	118	31	24	30	27	2	4
Do	Ta-ee-teet-on	do	93	38	29	10	9	3	4
Do	Kvaskagutee	do	135	50	41	10	6	6	13
Do	Kukatu	do	234	97	67	36	32	2	
Do	Naaniagh	do	390	83	117	40	46	32	52
Do	Talgantee	do	169	52	51	27	33	2	4
Do	Kiksatee	do	99	31	21	21	18	4	4
Do	Kadi-ettee	do	172	61	60	20	19	4	8
Port Stuart	Ahialt	Port Stuart	186	50	45	42	49		
Tourgass	Kitahoonet	Clarence Strait	315	85	90	60	65	6	9
Cape Fox	Lukhselee	Cape Fox	177	45	50	39	43		
Kaigani	Youahno	Prince of Wales Archipelago.	234	68	70	44	52		
Do	Clickass	do	417	98	105	102	112		
Do	Quiahanless	do	148	20	35	42	41		
Do	Howguan	do	458	117	121	113	107		
Do	Shaaguan	do	229	53	61	54	61		
Do	Chachini	do	249	65	62	59	63		

From this time forward the biennial reports of the Russian-American Company to the imperial ministerium of commerce gave the population of the Russian possessions in America as from 56,000 to 70,000. No authority for these statements existed, but they were repeated again and again until the sale of the country to the United States, though in the meantime several enumerations were made showing a very different result.

The first enumeration of the tribes on Norton Sound and on the Lower Yukon, or Kvikhpak, was accomplished by Lieutenant Zagoskin, of the Russian navy, during an exploration of that region in the years 1842, 1843, and 1844. It is of course impossible at this date to recognize all the names of villages given by Zagoskin, but as far as I can trace his count to personal observation it appears to have been accurate. His exploration took place just after the whole region traversed by him had been depopulated by smallpox. In the table which is here reproduced Zagoskin's division of the people into Christians and pagans has been omitted.

Enumeration by Lieutenant Zagoskin, I. R. N., of natives of Norton Sound and Lower Yukon in 1842, 1843, and 1844.

Tribes and villages.	Houses.	People.
KANG-YULIT PEOPLE [INNUIT].		
Chnagmute tribe, Norton Sound.		
Oonalaklik village	2	13
Nigvilnuk village	1	5
Kikhtaguk village	3	28
Tachik village	3	19
Atkhvik village	4	57
Tikmikhtalik village	4	45
Pashtolik village	7	116
Total Chnagmute	24	283
Kvikhpagmute, Kvikhpak River.		
Kavlanagmute village	1	11
Nigikligmute village	1	13
Kanigmute village	4	45
Ankachagmute village	6	122
Takchagmute village	3	40
Ikuagmute village	6	130
Nukhluagmute village	4	60
Ikogmute village	5	92
Ikaligvigmute village	3	45
Paimute village	5	123
Total Kvikhpagmute	38	681
Kuskokvigmute, Kuskokvim River.		
Khalkagmute village	5	120
Ookhagmute village	4	61
Tulukagnagmute village	5	90
Kvigimpainagmute village	4	89
Total Kuskokvigmute	18	360
Total Kang-yulit	80	1,324
TTYNNAI PEOPLE [TINNEH].		
Yunakhotana, Kvikhpak River.		
Noggai village	1	10
Minkhotliatno village	3	46
Total Yunakhotana	4	56
Yunnakakhotana, Koyukuk River.		
Notaglita village	3	37
Tlialilkakat village	3	27
Tashoshgon village	2	30
Tok-khakat village	1	6
Nok-khakat village	3	50
Kakhliakhliakat village	2	26
Tsonagogliakhten village	1	11
Tsogliakhten village	1	7
Khotilkakat village	4	65
Oonilgachtkhokh village	2	17
Nulato village	1	13
Total Yunnakakhotana	23	289
Inkilik tribe, Kvikhpak River.		
Kunkhogliak village	2	11
Oolukak village	4	35
Tuttago village	2	32
Kakagokhakat village	1	9
Khutulkakat village	2	16
K-khaltat village	1	9
Khogoltlinde village	4	60
Takaiak village	7	81
Khulikakat village	1	11
Total Inkilik	24	264
Tlegonkhotana, Tlegon River.		
Innoka village	3	44
Ttalitui village	3	45
Total Tlegonkhotana	6	89
Yugelnut, Kvikhpak, and Kuskokvim rivers.		
Inselnostlende village	2	33
Khuingitatekhten village	3	37
Iltenleiden village	6	100
Tlegoshitno village	3	45
Khuligichakat village	5	70
Kvigimpainagmute village	3	71
Vashichagat village	5	80
Anvig village	5	120
Makki village	3	44
Anilukhtakpak village	8	170
Total Yugelnut	43	770
Goltzanc, interior.		
Khunanilinde village	1	9
Tochotno village	1	9
Total Goltzanc	2	18
Total Ttynnai	102	1,486
Total Kang-yulit	80	1,324
Grand total	182	2,810

The importance of Zagoskin's population statistics is altogether of a relative nature. He simply counted those whom he came in contact with, and made no estimates of people living away from his line of progress; hence I can make no comparison between his data and mine. But from this partial return it is seen that, then as now, the villages in the vicinity of the seacoast were more populous than those of the interior, and that the houses of the Tinneh tribes must be of almost the same capacity as those of the Innuit. Of the former Zagoskin counted 1,486, living in 102 houses, making an average of nearly 15 inmates to each dwelling, while the Innuit counted by him numbered 1,324, in 80 houses, an average of a little over 15 to each dwelling. Among the Innuit the average number of dwellings in each village is nearly four, while the Tinneh villages average less than three.

From this time forward until the year 1860 no population returns of Russian America were published, with the exception of the fictitious total of 56,000, contained in the brief biennial reports of the Russian-American Company, referred to above.

In 1860 the holy synod, the highest ecclesiastical authority in Russia, published in its annual report a census of Christians in Russian America, as furnished by the priests and missionaries stationed in the colonies. This included nearly all the natives under immediate control of the company, and was as follows:

Christians in Russian America in 1860, exclusive of Russians.

Tribes.	Total.	Males.	Females.	Tribes.	Total.	Males.	Females.
Creoles	1,676	853	823	Kuskokwims	1,395	755	640
Aleut (including Kaniags)	4,391	2,206	2,185	Kvikhpaks	379	226	153
Kenaitze	937	430	507	Agulmute	39	19	20
Chugach	456	226	230	Ingalik	476	263	213
Mednovtze	18	17	1	Koltchan	190	97	93
Magmute	19	18	1	Koloshians	447	221	226
Aglemute	39	19	20	Total	10,668	5,455	5,213
Aziagmute	206	105	101				

In 1861 Lieutenant Wehrman, of the Russian navy, but then in the employ of the Russian-American Company, compiled a census of the Kolosh or Thlinket tribes by settlements. Wehrman gave the number of free males and females and male and female slaves separately. The appended reproduction of Wehrman's table will show plainly that he obtained only the totals at each place and divided them subsequently:

Thlinket (Kolosh) population in 1861.

Villages.	Total.	Free.		Slave.		Villages.	Total.	Free.		Slave.	
		Males.	Females.	Males.	Females.			Males.	Females.	Males.	Females.
Sitka villages	1,344	715	535	51	43	Stakhine villages	697	308	308	41	40
Khutznoo villages	600	280	280	20	20	Kaigan villages	758	280	280	99	99
Chilkhat villages	1,616	728	728	80	80	Ltuia villages	590	265	267	29	29
Kake villages	445	210	210	13	12	Yakutat villages	380	163	168	25	24
Takoo villages	712	335	337	20	20						
Hoonyah villages	411	195	197	10	9	Total	8,597	3,969	3,800	422	406
Tongass villages	333	154	154	13	12						
Cross Sound villages	331	154	154	13	10	Total free	7,769				
Assan Harbor villages	118	56	56	3	3	Total slave	828				
Kuyutzk villages	262	126	126	5	5						

If the total of the above table be correct, there appears to have been no increase or decrease in the numbers of Thlinket during the twenty years intervening between the count of Wehrman and that of Sir James Douglas, the latter having arrived at a total of 7,190 exclusive of the Sitkan clan, which numbers 1,344 in Wehrman's table.

During the last few years of the Russian-American Company's existence the population returns made by various colonial and inspecting officers appear very much confused. Thus we have two counts dated January 1, 1862, showing the same total, but differing very much in distribution. Both counts are incomplete, ignoring the Thlinket and nearly all the northern natives. One enumerates the people by race and tribe, the other by districts; they were printed by Tikhmenief in his Historical Review, as follows:

Russians	577	Sitka district	988
Foreigners	6	Kadiak district	5,985
Creoles	1,892	Oonalashka district	1,359
Aleut (including Kadiak.)	4,752	Atkha district	972
Kenaïtze	927	Kurile district	253
Chugach and Atnah	719	Northern district	545
Kuskokwims	1,283	Kenaï district	54
Total	10,156	Total	10,156

In Tikhmenief's work no explanation is given that might enable us to analyze these puzzling figures. For instance, the 1,283 Kuskokwims could only be counted with the northern district, but the total of that district is given in the other list as only 545.

In 1863, in the second volume of his work, Tikhmenief published a table with the following heading: "Population statistics of inhabitants of Russian America dependent upon and actually counted by the Russian-American Company," as follows:

January 1—		January 1—		January 1—	
1830	10,327	1842	7,470	1854	9,514
1831	10,423	1843	7,581	1855	9,660
1832	10,493	1844	7,896	1856	9,725
1833	10,800	1845	7,224	1857	9,792
1834	10,670	1846	7,783	1858	10,075
1835	10,867	1847	7,874	1859	9,902
1836	10,989	1848	8,707	1860	10,121
1837	11,022	1849	8,892	1861	10,136
1838	10,313	1850	9,081	1862	10,156
1839	8,070	1851	9,273	1863	10,125
1840	7,574	1852	9,452		
1841	7,580	1853	9,573		

This list ought to agree with the number of Christians reported by the holy synod, but in the year 1860, for instance, the priests and missionaries reported 547 Christians in excess of the "total counted" of the Russian-American Company. The above table is of importance chiefly as showing the effects of the smallpox epidemic, which appeared in the Russian colonies in 1837. During the first two years the loss was nearly 3,000, and the population gradually decreased from 11,022, in 1837, reaching its lowest point, 7,224, in 1845. During the second year of the epidemic the mortality was greatest, over 2,000; but it must be remembered that these figures relate only to those natives under the immediate control of the company and accessible to medical treatment and vaccination. If the mortality in these favored sections was 20 per cent, it is safe to assume that in the remote regions of the north, in the densely peopled districts of the Yukon, Kuskokwim, and Bristol Bay, it must have been fully 50 per cent, if not more. This assumption is borne out fully by the evidence of native tradition and ruins of depopulated and abandoned villages still in existence. The abandoned village sites in the Yukon and Kuskokwim valleys far outnumber the settlements now inhabited, and whole populous villages were converted into cemeteries by the burial of the dead in their own dwellings. Such funereal towns are still frequently met with in the whole coast region of Alaska west of Mount St. Elias. Among the Thlinket tribes, who practice cremation, the losses must have been equally great, but with them no traces of the universal calamity of nearly half a century ago remain, except in the blind and pock-marked persons of the few aged of both sexes.

We have still another count of inhabitants of Russian America, published in 1863 by a special inspector of the imperial government, Kostlivtzof, as follows:

Inhabitants of Russian America January 1, 1863.

Tribes.	Males.	Females	Total
Creoles	925	971	1,896
Aleut	1,236	1,192	2,428
Kenaïtze	430	507	937
Kadiaks	1,115	1,102	2,217
Chugach	226	230	456
	3,932	4,002	a 7,934
To this Kostlivtzof added an estimate of Atnahs or Copper River natives			2,500
And Kolosh or Thlinket			20,000
Making a total of			30,434

a This is 2,191 less than the company's total for the same year, but the Russians and northern natives were omitted.

About as good an estimate as Veniaminof made over twenty years previously, if we except the classification. By reducing his estimate of Atnahs to 500, and that of Thlinket to 8,000, and classing 14,000 as northern natives, Kostlivtzof would have been nearer the truth and still within his own estimate of the total population of the present Alaska.

To show the extravagant estimates of the population of Alaska made at the time of its acquisition by the United States, I quote the following tables from the reports of Major-General Halleck, United States Army, and of Rev. Vincent Collyer, both made in the year 1868:

Major-General Halleck's estimate of population of Alaska.

Koloshians: Hydas	600	[Thlinket]—Continued.	
[Thlinket]:		Chilkahts	2,000
Henegas	500	Hoodsnahoos	1,000
Chatsinas [?]	500	Hunias	1,000
Tongass	500	Sitkas	1,200
Stickeens [Stakhin]	1,000	Hyaks	15,000
Kakes [Kehk]	1,200	Kenaïans [Athabaskans]	25,000
Kous [?]	800	Aleutian	10,000
Koutznous	800	Eskimo	20,000
Awks	800		
Samdam Takos	500	Total	82,400

The Rev. Vincent Collyer, in his report to the Commissioner of Indian Affairs, reproduced General Halleck's wild estimate and added a special estimate of the number of Kolosh or Thlinket, furnished by a trader, Mahoney, who certainly ought to have been better informed:

Mahoney's estimate of Thlinket.

Bering Bay:		Stephens Passage:	
Yakutat	300	Takos	2,000
Stikine	1,200	Sitka	1,000
Tongass	800	Admiralty Island:	
Cross Sound:		Auk	750
Whinega [?]	500	Hoodsinoo	1,000
Whinega (interior)	800	Kake	750
Chilkat Inlet:			
Chilkat	2,500	Total Thlinket	11,900
Anega [?]	300		

General Halleck's table, in addition to a general overestimate, contains such duplications as "Koutznoo" and "Hoodsnahoo," both the same tribe; "Kakes" and "Koos" also the same, and 15,000 "Hyaks," an imaginary tribe.

A single glance at any map of southern Alaska will reveal the utter absurdity of the Collyer-Mahoney estimate.

Education.

On the subject of education in Alaska but little is to be said. Under the administration of the Russian-American Company schools were maintained at various stations, under the personal superintendence of the trader or agent, in which children of both sexes were taught during the winter season. Many competent copyists, clerks, and bookkeepers were furnished from these district schools. At Sitka these establishments were conducted on a more pretentious scale, with competent teachers (generally selected from naval and petty officers), scientific apparatus, and facilities for studying navigation. This was a great step in advance from the first primary class established on Kadiak Island in 1784, by Grigor Shelikhof and his wife; but from the beginning to the end of the Russian Company's rule that corporation, while apparently complying to the letter with the requirements of its charter relative to the maintenance of schools, arranged all educational facilities offered to the natives of Alaska with the sole object of benefiting the business of the company rather than with that of educating the people. Bright youths among the creoles (offspring of Russian fathers and native mothers) were carefully trained in navigation and the mechanic arts, but they were compelled to remain in the company's service for fifteen years after finishing their course of instruction. Competent masters of vessels, mechanics, and bookkeepers were thus secured at small expense, and firmly bound to the company's interests, as there was no danger of their leaving the service if dissatisfied. Creole girls in limited numbers were trained to become housekeepers and wives of the employees of the company, who were thus prevented from leaving the colonies. To the masses of the native population, however, educational facilities were not extended, as none of the Russian missionary stations maintained a school except for the training of children of the clergy. There was a seminary at Sitka for several years, in which many of the creole and native priests now officiating in Alaska received their first instruction, but this establishment was subsequently removed to Kamchatka. In the creole settlements of the Kadiak and Aleutian districts parents taught their children to write a little and read the catechism, prayers, and a few chapters of the Bible in the Russian language or one of the native dialects, and this rudimentary education is still found to exist in many of the isolated communities. Nearly all these schools were discontinued some years previous to the transfer of the country to the United States, when the Russian Company was endeavoring to relieve itself from the maintenance of schools, churches, and local government.

At present the only schools in all western Alaska where English is taught are on the Pribylof islands, and at Iliuliuk settlement, Oonalashka, both being maintained at the expense of a trading firm. The daily attendance in the seal island (Pribylof) schools is kept up to an average of 56 on St. Paul Island and 16 on St. George, through the constant efforts of Government agents stationed on the islands. At Oonalashka, a village of nearly 300 inhabitants, the attendance varies from 10 to 20. Two other schools, where Russian only is taught, are reported at Belkovsky, in the Aliaska peninsula, and at Alexandrovsk, on the Nushegak River, with an average attendance of 6 for each. But in spite of these poor facilities, settlements like Kadiak, Belkovsky, Iliuliuk, Afognak, where the creole element prevails, furnish an exhibit of from 50 to 75 per cent of the population able to read and write in Russian or the native vernacular, or both. This is all that can be said concerning education in western Alaska.

In southeastern Alaska quite a different and more promising state of affairs exists. Here the Presbyterian Board of Missions has done much in the way of establishing schools and furnishing teachers for the same, and under its auspices a school and a home for girls have been maintained at Wrangell. The former institution has a daily attendance of from 60 to 100 pupils, while the home contains 30 inmates.

At Sitka a school was established in April, 1878, also under the auspices of the Presbyterian mission, with 2 teachers, which school is still in operation, with an average daily attendance of from 100 to 150. With the assistance of the naval commander at Sitka a school was opened there in 1879 for the benefit of the Russian-speaking children, whose parents felt scruples about sending their children to sectarian schools of another denomination. The attendance in this school is reported to average from 45 to 55.

At present the Presbyterian missionaries have schools in operation in the Chilkat villages, on Lynn Canal, at the principal Hoonyah village on Cross Sound, and also at Kaigan, on the south end of Prince of Wales Island, among the Hyda tribe.

A number of native Alaskan youths have also been received into the United States Indian school at Forest Grove, Oreg., but thus far they have all been selected from the pagan tribes of southeastern Alaska by the Presbyterian missionaries, while the bulk of native Alaskan population, located in the west, has been totally neglected. The natives and creoles all along the coast, from Mount St. Elias westward, are too strongly wedded to the faith of the Greek Orthodox Church (adopted by their forefathers nearly a century ago) to take kindly to sectarian schools of another denomination.

The Russian Church claims on its registers 10,950 members, distributed as follows:

Sitka Parish	275	Pribylof Parish	372
Unalaska Parish	1,364	Nushegak mission	2,848
Belkovsky Parish	633	Yukon mission	2,252
Kadiak Parish	2,606	Kenai mission	600

Of these numbers at least half of those counted with the northern missions, or 2,500, may be safely stricken off as fictitious; 1,013, the creoles, are semicivilized, a small percentage being able to read and write, while the remainder are savages to all intents and purposes.

In the discussion of this subject, embodying as it does a vital interest to the people of Alaska, we are brought face to face with many natural and some artificial difficulties. In the first place, the limit to which a savage people, forced by all the pressure of a higher civilization, will progress has been repeatedly marked in the examples recorded of the educational disappointments and successes which have attended the efforts of our Government and our clergy to elevate the minds and advance the comfortable living of our own immediate aborigines. If the youth of Alaska are to be lifted above their existing low medium level, in our opinion the Government of the United States is the best able, from its position of strict neutrality among religious creeds, to promote the progress of simple elementary education among those people.

The Russian Church, which is the dominant ecclesiastical power in Alaska, is of course poor, comparatively speaking, necessarily so, and the great majority of these chapels are in the hands of natives and creoles, who are not members of the clergy. A somnolent organization is their chief constitution, and they drone through the exercises of the church as appointed, preside at its calendar days of festivity, and then retire seemingly exhausted and desirous of repose. If anything can be done to reach these men, to invigorate and stir them up, it must come from the individual supervision and orders of some active, zealous head of the church.

Among the 7,000 or 8,000 members of the Russian Church I have found less than 400 able to read and write in either the Russian, the Aleutian, or the Kadiak vernacular, though in the villages where parish churches are located quite 30 per cent of the people possess these rudiments of education.

Not one of the three missions of the Yukon, Nushegak, and Kenai possesses a school, and in the village immediately surrounding the former (which now has a native missionary) I found but one man outside of the attachés of the church who could even speak the Russian language. The late Bishop Nestor had planned the establishment of a training school for native boys from all parts of the territory at Unalaska, but at his death the project was abandoned.

Among the Innuits are found a quickness of apprehension and a lurking spirit of inquiry which point them out as capable of being very much benefited by an intelligent system of educational labor, provided it can be established in their country. They are, if anything, brighter and more desirous of learning than the Aleutians themselves, who appear, as a people, to be degenerating, owing to the hybridization constantly going on in their country.

The natives themselves are quickened into appreciation of the benefits of an education when they observe the advantages which those among their number who are conversant in the method and manner of conducting trade and keeping accounts have over the rest, and see the advancement of these to positions of trust and confidence by the traders. This practical application reaches them fairly and fully, where the most eloquent and cogent advocate of the abstract

advantages of education would fail to make the slightest impression or to arouse a passing interest in their minds.

All those who now read and write, principally their own language, among the Aleutians as a class and the Kadiak people, have derived these elementary rudiments of instruction from the Greek Catholic Church. The father who can read and write, as a rule, teaches his son, while the exercises of the church keep the lesson somewhat fixed in the juvenile mind.

At the location of all parish churches it is supposed or expected that schools will be maintained by the church authorities, but, as already mentioned, there is much laxity in this respect, and at least 20,000 natives are entirely without the remotest influence of church or school—a fact our boards of foreign missions might take into consideration.

Under existing circumstances the General Government could extend educational facilities only through the medium of the Indian Bureau, a branch of administration having as yet no foothold in Alaska. The extension of all the complicated and expensive machinery of that Bureau would be unwise indeed among tribes now entirely self-supporting and occupying no lands attractive to white men; but as an entering wedge, and an earnest of future civilization, 15 or 20 youths might be chosen from various regions, instructed in some of the Indian schools (such as that at Carlisle, Pa., for instance), and, if found capable, trained as teachers in some normal school. Care should be taken in the selection of boys, who should be pure natives and not the offspring of traders and native women, in order to insure the desired future benefit.

Quite a large number of Aleutian youths have been, since the transfer, from one cause or another, taken down to San Francisco and the States east of the Rocky Mountains and there educated, and in all instances of which I have knowledge they have invariably returned, if living, to the country of their birth. This is simply natural and needs no extended explanation.

Diseases.

Those diseases which are most fatal to life in one section of Alaska seem to be applicable to all the others. In the first place, the native children, as they grow up, have little or no parental supervision or care in regard to clothing, etc., from a purely sanitary point of view; for the little fellows, male and female, for the first few years of their lives are more often naked than clothed at all seasons of the year, though the little girls, as a rule, earliest receive their garments. Exposed as they are in their manner of living to drafts, to insufficient covering, and cold nooks for slumber, they naturally at the outset of their rude lives lay the foundation for pulmonic troubles in all their varied degrees. Consumption is therefore the simple and comprehensive title for that disease which destroys the greatest number throughout Alaska. The Aleut, the Indian, and the Eskimo suffer from it alike; and they all exhibit the same stolid indifference to its stealthy but fatal advancement—no extra care, no attempt to ward it off, protect, or shelter against it, not even until the supreme moment of dissolution.

After consumption, perhaps the largest number of deaths may be ascribed to scrofulous diseases, which, taking the form of malignant ulcers, eat into the vitals and destroy them, rendering the people of whole settlements sometimes lepers in the eyes of the civilized visitor; and it is hard to find a settlement in the whole country where at least one or more of the families therein has not the singularly prominent scars peculiar to the disease. Most of this scrofulous complaint being on the surface of the patient's body, as it were, one would naturally look for some care and attention on the part of the sufferer toward the alleviation of his own misery, while with regard to consumption, that being more concealed and less disgreeable both to the native and his associates, they are not likely to notice it in the way of applying remedies; but, so far as I know, the same apathy exists among the natives with regard to the treatment of the latter. It is, of course, immensely aggravated and made more violent by their neglect and filthy habits.

[1] A rather disgusting habit, common to all the uncivilized natives, may perhaps serve to spread the disease. Devoted wives carefully gather in cups or other receptacles the expectorations of their consumptive husbands (blood as well as matter) and swallow them.

Following these two great sources of disease and death may be enumerated quite a number of other ills, such as paralysis, inflammation of the bowels, a few cases of fits, and a rather abrupt ending of advanced middle-aged life from what is called "general debility;" or, in other words, these people, as a rule, live to no great age, as might be inferred from the method and exigencies of their life. When a man or woman rounds his or her fifty years he or she is a rare example of the tribe; yet if he or she is free from rheumatic troubles, or the death grasp of disease, it is never without injured vision; for it is a noteworthy fact that eye diseases necessarily arise from the smoky interiors of their barabaras and other places of residence, which, with the snow, so affect the eyes that the middle-aged are rarely without signs of decay, the various stages of granular ophthalmia being most marked.

For the prevention of snow-blindness the Eskimo people use their peculiar goggles, but the greater evil of smoke poison to the ophthalmic nerve is not overcome by any of them. Nearly all of the traders have their medicine chests, and much relief and real kindness are extended by them to the suffering natives immediately about them wherever they are; but what they do or can do is a mere drop in the bucket. Hence it will be observed that the natives of Alaska are not a long-lived people as a rule, and when a very old person is found among them he gives evidence of what must have been in youth a magnificent constitution.

The Indian, Eskimo, or Aleut has not, however, an exalted idea of our pharmacy; in other words, he appreciates only forcible treatment and nothing else will satisfy him. As an example, of Epsom salts the traders are obliged to give, if they give any at all, to a suffering native, a great dose, or there is no effect whatever in the operation. Naturally the traders use only the very simplest remedial agent known to the apothecary. As a rule, however, of internal remedies a child's dose ordinarily will act readily upon an adult native, while, on the other hand, applications to the skin—tinctures, liniments, etc.—must be of treble strength to produce the desired effect. For instance, tincture of iodine to reduce swelling on an Alaskan native's body must be of such a strength that it would blister a Caucasian epidermis.

The natives themselves have no medicine whatever, nor any knowledge, as far as can be discovered, of any medicinal herb whatever—which is a very singular fact. All their lesser and slighter indisposition, arising from any natural cause, they treat by the universal and everlasting sweat bath. This is their panacea, and this is all, except when they call in the "shaman" to either worry the unhappy patient to death or to prolong his wretched existence for a period by stimulating perhaps an undue nervous tension, which causes the usually languid and resigned sufferer to rally, as it were, before the flame flickers out.

These people are certainly fatalists, and are wonderful in their patience when suffering all the ills that flesh is heir to in their lonely, desolate homes.

In addition to the troubles for which the natives themselves are responsible, dreadful consequences arose from the introduction of smallpox, through Russian intercourse, first in 1838 and 1839. This disease swept like wildfire from its initial point at the confines of the southern limits of the Alexander Archipelago over the whole length of the Aleutian Chain, Cook Inlet, Bristol Bay, and Kuskokwim, fading out in the north until entirely checked by the arctic cold. It actually carried in its grim grasp one-half of the whole population of Alaska to an abrupt and violent death. In certain places it swept out the entire population, being exceedingly virulent among the Thlinket of the Alexander Archipelago. The physician who knows this, however, will readily understand how a people living as they have lived and yet live, with their strange apathy, ignorance of sanitary regulations, will be crushed before the onslaught of this disease. When La Pérouse visited this country, at Lituya Bay he found natives (in 1786), to his great astonishment, marked by smallpox, which it seems the savages had contracted from a visit made to the coast to the southward by the Spaniards nine or ten years earlier; yet there is no definite knowledge that this epidemic in those early times even approximated the extent of the ravages of that which we have just cited. In 1843 and 1844 another outbreak of smallpox took place on the Aleutian Islands, but the people did not suffer as they had previously done, great numbers of them having been vaccinated by the Russians in the meantime.

Upon this point the only interest or attention which these people have given to our medical

practice is manifested; they occasionally ask why the American Government does not send out its agents for the purpose of vaccinating their people, as the Russians did—a suggestion which, though late, may be timely.

Syphilitic disease was probably first introduced in Alaska by the Russians, though several writers claim that the scourge already existed in the Aleutian Islands when the Muscovite hunters made their appearance there. At any rate, Captain Cook records that several of his crew contracted the disease during their brief stay on Unalaska Island in the year 1778. Syphilis yet exists in all coast settlements, chiefly in the vicinity of stations visited by shipping, and also in the interior where the people have constant intercourse with the seaboard. It is found in all stages and degrees, being entirely neglected by the natives themselves, and only at a few trading centers, where wealthy firms maintain physicians, and perhaps in the towns of southeastern Alaska, is anything done to check its ravages.

Another imported plague among these people is due to the introduction of the measles, a simple trouble with us, but of fatal power with them, assuming, doubtless on account of the exigencies of the climate and the natives' methods of life, the "black" form. It first ravaged Kadiak Island and the mainland contiguous on one or two occasions, and produced a panic also at Sitka. The climate of Alaska renders its treatment very difficult, and it is an exceedingly dangerous complaint there for even those who have the best of care and medical attention. The last extended occurrence of this disease took place during the winter of 1874–75, principally confined to the Kadiak Islands.

Typhoid pneumonia, also, from time to time, has wasted whole settlements, chiefly on the seaboard. The creoles and natives seem to yield at once to this disease, making scarcely any effort to resist its progress. It assumes an altogether epidemic form, its advance being easily traced as it is carried from one village to another by trading vessels or canoes. During the last few years the number of skilled sea-otter hunters has been reduced nearly one-half by this disease.

In the absence of all vital statistics, the question as to whether the natives of Alaska are increasing or decreasing in numbers is difficult to answer, but as an individual opinion it may be stated that the inhabitants of the Aleutian Archipelago, the peninsula, and Cook Inlet are to-day nearly as numerous as they have been at any time since the destruction in 1838 and 1839 caused by the smallpox plague of that season. All authorities agree in saying that these people have never regained their former strength in point of numbers.

The Eskimo on the Arctic coast and St. Lawrence Island, utterly demoralized by the unchecked importation of spirituous liquors by whalers and traders, are rapidly decreasing under the alternate effects of wild intoxication and of starvation, the latter being the consequence of utter recklessness engendered by the former. Their extermination will probably follow that of the walrus—their staff of life—now being wantonly destroyed by thousands for ivory alone.

With reference to the Athabaskans of the interior and the Eskimo tribes south of Bering Strait it may be said that they seem to be as numerous now as they were twenty years ago, and that they probably number as many as the country will support, always bearing in mind their extraordinary wastefulness in seasons of plenty. Were they provident, they might live by tens where a single one exists now.

The Thlinket of southeastern Alaska have perhaps the greatest vitality of any of the Alaskan tribes. At present they are under the influence of Presbyterian missionaries, and we may hope for a gradual amelioration in their mode of life and the introduction of some regard for sanitary measures. Living in more intimate relations, and in constant and universal contact with Caucasians, the Thlinket are subject to the drawbacks as well as the advantages of such an association; but taking everything into consideration, a rapid decrease of native population in this section of Alaska need not be apprehended, and there is possibility of increase in the future.

POLITICAL STATUS.

Alaska is now, and has been since its acquisition by the United States, "a thing which it is not," a territory in name only, without its organization. It is a customs district, for the collection of customs only, with a collector and three deputies separated by hundreds and even

thousands of miles. It has no laws but a few treasury regulations, with no county or other subdivisions, and of course no capital. The collector of customs and the only representative of police restrictions—a man-of-war with its commander—are located at Sitka, cut off from all communication with the bulk of the territory except by way of San Francisco.

In the strip of country between Cape Fox and Mount St. Elias, 300 miles long by from 30 to 60 miles wide, including islands containing about 29,000 square miles, there are at present possibly 1,500 whites and creoles able to perform the functions of citizenship, and 7,000 wild Indians; about enough for a small county organization.

In all the western region there are 139 white males and 5 females, including 3 boys and 1 girl. Though not speaking English, among the creoles might be found between 400 and 500 sufficiently intelligent to understand what constitutional government means, making an average of less than one possible citizen for every 600 square miles of superficial area, without regard to the fact that many of the men are foreigners.

The main difficulty of organizing or legislating for Alaska lies in the utter impossibility of reconciling the widely diverging interests and wants of two sections, entirely separate geographically, and having no one feature alike, besides being very unequal in size. The general map accompanying this report will illustrate this at a glance. The only practical and economical solution of the question will be to treat each section separately.

A reference to the map will impress the observer with the vast distance, in many cases, from one settlement to its neighbor, rendering, as a rule, communication between the small villages and settlements of the territory infrequent and rare, San Francisco being the central point for information received annually from the whole territory; for instance, the people of Kadiak or Oonalashka hear from and learn of anyone in Sitka by the "Golden Gate," and vice versa.

The only official knowledge which the Government has or can have of the condition of affairs in Alaska has been and must be derived from the cruising of the revenue-marine steamers, and from the commander of the naval vessel stationed in the Alexander Archipelago, who monthly reports the natives "in all parts of Alaska" quiet and peaceable.

The mail line established between Sitka, Wrangell, and Port Townsend, in Puget Sound, is the only branch of the postal service extended over Alaska.

MEAN TEMPERATURE AT VARIOUS POINTS IN ALASKA.

The following table shows the means of temperature for the months of January and July at various points in the Territory:

[Degrees.]

	In January.	In July.		In January.	In July.
Sitka	+30	+55	Coast of Bering Sea	−10	+50
Tongas	+33	+58	Yukon Basin	−26	+65
Wrangell	+22	+58	St. Michael	+ 3	+54
Kadiak	+28	+57	Pribylof Islands	+28	+46

A FEW REMARKS ON SPELLING OF RUSSIAN AND NATIVE NAMES.

In spelling the Russian and Alaskan names and terms throughout this report I have endeavored to represent Russian and native sounds by their true phonetic equivalents in the English alphabet.

The Russian names and words ending in *off*, *ow*, or *ov*, as heretofore variously spelled, should be written *of*, the pronunciation being exactly that of the English word "of"; for instance, *Baránof*, *Veniamínof;* in the possessive case, however, or in the plural, the sound of "*o*" always takes the place of the "*f;*" *e. g.*, *Baránova*, *óstrova*, etc.

In words like Kamchatka the letters *ch* represent the full phonetic value of the corresponding Russian letter. The old way of spelling it, Kamschatka, is purely German, and not to be tolerated in an English work.

The Russian and native strong aspirate, resembling somewhat the German *ch* in *Woche*, I have represented by *kh*.

Profiting by observance of linguistic defects in former publications on Alaska, I have abstained as far as possible from the use of Russian or native terms. The few such terms retained for the want of a good English equivalent are:

Barábara, a term of Siberian origin for a semisubterranean hut or dwelling.

Beluga, the white grampus or white whale.

Bidár, a Kamchatkan word, an open boat with a wooden frame and covered with seal, sea-lion, or walrus skin.

Bidárka, a skin canoe of the Aleutians, covered all over, with the exception of one, two, or three circular openings to accommodate as many paddlers.

Kaiak, Eskimo skin canoe.

Kamlēika, a Siberian term, waterproof shirt of seal, whale, or bear gut.

Parkee, a Kamchatkan word, upper garment of fur, with small head opening and sleeves, varying in length.

Promyshlénik, a Russian word for fur hunters or laborers, now obsolete.

Shamán, a Kamchatkan term for sorcerer or medicine man, used by many tribes who once were subject to Russian influence.

Toyón, Kamchatkan term for chief, introduced by Russians. *Tuyúk* and *Tookoo* with Aleutians and other tribes.

Tundra, a Siberian term, a moor, morass, or swampy plain, producing a dense growth of mosses and grasses over a frozen subsoil and ice, which does not thaw to a greater depth than 18 inches below the surface.

Tungak, a term used by certain Eskimo tribes for a shaman or conjurer.

Resources.

The territory of Alaska, so called, an area nearly equal to one-sixth of the whole United States and territories, is a region to which the attention of the American people was very suddenly and earnestly directed in the summer of 1867, when it was secured as a measure of diplomacy and good will between the American and Russian Governments. The Russians, who occupied the land with an eye primarily to the fur trade and its dependencies, retired from that country, leaving us a generally correct map of the vast extent of rugged coast, locating its people in a measure correctly, with some facts and figures bearing upon the resources, natural history, and trade which have since been found to be quite accurate, but which at the time of the transfer were so clouded and distorted by the advocates of the purchase and its opponents that the real truth in regard to the subject could scarcely be observed.

When the United States took possession of Alaska a great many active and ambitious men on the Pacific coast were imbued with the idea that much that was really valuable in Alaska in the line of furs and the precious metals would be developed to their great gain and benefit if they gave the subject the attention which it deserved. Accordingly, many expeditions were fitted out at San Francisco, Puget Sound, and other points on the Pacific coast, and directed to an examination of these reputed sources of wealth in that distant country. Thirteen years have rolled by, and in that time we have been enabled to judge pretty accurately of the relative value of this new territory in comparison with that of our nearer possessions, and it is now known that the fur trade of Alaska is all and even more than it was reputed to be by the Russians.

In this connection the most notable instance, perhaps, of the great value of these interests may be cited in the case of the seal islands. It will be remembered that at the time of the transfer, when the most eloquent advocates of the purchase were exhausting the fertility of their brains in drumming up and securing every possible argument in favor of the purchase, though the fur trade of the mainland, the sea-otter fisheries, and the possible extent of trade in walrus oil and ivory were dwelt upon with great emphasis, these fur seal islands did not receive even a passing notice as a source of revenue or value to the public. Yet it has transpired, since the

Government has been wise enough to follow out the general policy which the Russians established of protecting the seal life on the Pribylof Islands, that these interests in our hands are so managed and directed that they pay into the treasury of the United States a sum sufficient to meet all the expenses of the government in behalf of Alaska, besides leaving a large excess every year.

Of other resources, such as the adaptation of the country for settlement by any considerable number of our people as agriculturists or husbandmen, and its actual value as a means of supplying gold and silver, coal or timber, it must be said that as yet no very remarkable gold or silver mines have been discovered, nor have there been any veins of coal worked that would in themselves sustain any considerable number of our people or give rise to any volume of trade.

The timber of Alaska in itself extends over a much larger area of that country than a great many surmise. It clothes the steep hills and mountain sides, and chokes up the valleys of the Alexander Archipelago and the contiguous mainland; it stretches, less dense but still abundant, along that inhospitable reach of territory which extends from the head of Cross Sound to the Kenai Peninsula, where, reaching down to the westward and southwestward as far as the eastern half of Kadiak Island, and thence across Shelikhof Strait, it is found on the mainland and on the peninsula bordering on the same latitude; but it is confined to the interior opposite Kadiak, not coming down to the coast as far eastward as Cape Douglas. Here, however, it impinges on the coast or Cook Inlet, reaching down to the shores and extending around to the Kenai Peninsula. From the interior of the peninsula above referred to the timber line over the whole of the interior of the great area of Alaska will be found to follow the coast line, at varying distances of from 100 to 160 miles from the seaboard, until that section of Alaska north of the Yukon mouth is reached, where a portion of the coast of Norton Sound is directly bordered by timber as far north as Cape Denbigh. From this point to the eastward and northeastward a line may be drawn just above the Yukon and its immediate tributaries as the northern limit of timber of any considerable extent. There are a number of small water courses rising here that find their way into the Arctic, bordered by hills and lowland ridges on which some wind-stunted timber is found, even to the shores of the Arctic Sea.

In thus broadly sketching the distribution of timber over Alaska it will be observed that the area thus clothed is very great; yet when we come to consider the quality of the timber itself, and its economic value in our markets, we are obliged to adopt the standard of the lumber mills in Oregon and Washington territory. Viewed in this light, we find that the best timber of Alaska is yellow cedar, which in itself is of great intrinsic value; but this cedar is not the dominant timber by any means; it is the exception to the rule. The great bulk of Alaskan timber is that known as Sitkan spruce, or balsam fir. The lumber sawed from this stock is naturally not of the first quality.

The fisheries, which I shall speak of hereafter, as also of the fur trade, cover a very large area, but their value and importance, in consequence of the limited market afforded for exportation on the Pacific coast, has not been fully developed. The supply certainly is more than equal to any demand.

The soil of Alaska is not sterile, being at many points of the requisite depth and fertility for the production of the very best crops of cereals and tubers. The difficulty with agricultural progress in Alaska is, therefore, not found in that respect; it is due to the peculiar climate.

Glancing at the map, the observer will notice that hydrographers have defined the passage of a warm current, sufficient in volume and high enough in temperature to traverse the vast expanse of the North Pacific from the coast of Japan up and across a little to the southward of the Aleutian Islands, and then deflecting down to the mouth of Columbia River, where it turns, one branch going north up along the coast of British Columbia by Sitka, and thence again to the westward until it turns and bends back upon itself. The other grand arm, continuing from the first point of bifurcation, in its quiet, steady flow to the Arctic, passes up to the northeastward through the Strait of Bering.[1] This warm current, stored with tropical heat, gives rise naturally, as it comes

[1] The existence of this northern branch of the warm Japanese current has been denied by Mr. William H. Dall, of the United States Coast and Geodetic Survey.

in contact with the colder water and air of the north, to excessive humidity, which takes form in the prevalent fog, sleet, and rain of Alaska, as noted and recorded with so much surprise by travelers and temporary residents from other climes. Therefore at Sitka, and, indeed, on the entire sea board of South Alaska and the Aleutian Islands, instead of finding a degree of excessive cold carried over to the mainland across the coast range, which the latitude would seem to indicate, we find a climate much more mild than rigorous; but the prevalence of fog clouds or banks, either hanging surcharged with moisture or dissolving into weeks of consecutive rain, so retard and arrest a proper ripening of fruits and vegetables in that climate that the reasonable certainty of success in a garden from year to year is destroyed.

When we look at Alaska we are impressed by one salient feature, and that is the remarkable distances which exist between the isolated settlements. It is not at first apparent, but it grows on the traveler until he is profoundly moved at the expenditure of physical labor, patience, and skill required to traverse any considerable district of that country.

The Sitkan district is essentially one of rugged inequality, being mountainous on the mainland to the exclusion of all other features, and equally so on the islands. It is traversed here, there, and everywhere by broad arms of the sea and their hundreds and thousands of lesser channels.

Land travel is simply impracticable. Nobody goes on a road; savages and whites all travel by the water. Perhaps the greatest humidity and the heaviest rainfall in the Alaskan country occur here. The equable and not rigorous climate permits of free navigation at all seasons of the year, and it is seldom indeed that the little lakes and shallow lagoons near the sea level are frozen so firmly as to allow of a winter's skating.

The Aleutian and Kadiak districts are quite as peculiar in themselves and as much individualized by their geological age and formation as is the Sitkan division. They hold within their boundaries a range of great fire mountains—grumbling, smoking, quaking hills; some of these volcanic peaks being so lofty and so impressive as to fix in the explorer's eye an image superb and grand, and so magnificent as to render adequate description quite impossible. Like the Sitkan district, the Aleutian and Kadiak regions are exceedingly mountainous, there being very little low or level land compared with the sum total of their superficial area; but in that portion extending for 1,100 miles to the westward of Kadiak, nearly over to Asia, bare of timber, a skeleton, as it were, is presented to the eye and strikes one with a sense of an individuality here in decided contrast with that of the Sitkan country. The hills not clothed with timber are covered to their summits in most cases with a thick crop of circumpolar sphagnum, interspersed with grasses, and a large flora, bright and beautiful in the summer season. To thoroughly appreciate how much moisture in the form of fog and rain settles upon the land, one can not do better than to leave the ship in the harbor, or the post where he is stationed, and take up a line of march through one of the narrow valleys near by to the summit of one of the lofty peaks. He will step upon what appeared from the window or the vessel a firm green sward, and sink to his waist in a shaking, tremulous bog, or slide over moss-grown shingle, painted and concealed by the luxuriant growth of cryptogamic life, where he expected to find a free and ready path.

Passing from this district, a very remarkable region is entered, which I have called the Yukon and the Kuskokwim divisions. I have during two summers traversed the major portion of it from the north to the south, confirming many new and some mooted points. This region covers the deltoid mouth of a vast river, the Yukon, and the sea-like estuary—the Amazonian mouth of another—the Kuskokwim, with the extraordinary shoals and bars of Bristol Bay, where the tides run with surprising volume. The country itself differs strikingly from the two divisions just sketched, consisting, as it does, of irregular mountain spurs planted on vast expanses of low, flat tundra. It is a country which, to our race perhaps, is far more inhospitable than either the Sitkan or Kadiak divisions; yet, strange to say, I have found therein the greatest concentrated population of the whole Territory. Of course it is not by agricultural, or by mining, or any other industry, save the aboriginal art of fishing and the traffic of the fur trade, that the people live; and again, when the fur-bearing animals are taken into account, the quality

and volume of that trade are far inferior to those of either of the previously-named divisions, and we find the natives existing in the greatest number where, according to our measure of compensation, they have the least to gain.

This country, outside of these detached mountain regions and spurs, is a great expanse of bog, lakes, large and small, with thousands of channels between them, and sluggish currents filled with grasses and other aqueous vegetation, indicated to the eye by the presence of water-lilies.

The traveler, tortured by mosquitoes in summer, blinded, confused, and disturbed by whirling "purgas," snow, and sleet in winter, finding the coast rendered almost inaccessible by the vast system of shoaling which the current of the greater Yukon has effected, passes to the interior, whose superficial area comprises nearly five-sixths of the landed surface of the Territory.

Here is an immense tract reaching from Bering Strait, in a succession of rolling ice-bound moors and low mountain ranges, for 700 miles an unbroken waste, to the boundary line of British America. Then, again, from the crests at the head of Cook Inlet and the flanks of Mount St. Elias northward over that vast area of rugged mountain and lonely moor to the east—nearly 800 miles—is a great expanse of country, over and through which not much intelligent exploration has been undertaken. A few traders and prospectors have gone up the Tanana and over the old-established track of the Yukon; others have passed to the shores of Kotzebue Sound overland from the Koyukuk. Dog-sled journeys have been made by the same people among the natives of the Kuskokwim and those of the coast between Bristol Bay and Norton Sound. But the trader as he travels sees nothing, remembers nothing, but his trade, and rarely is he capable of giving any definite information beyond the single item of his losses or his gains through the regions he may traverse. We know, however, enough to say now, without much hesitation, that this great extent which we call the interior is by its position barred out from occupation and settlement by our own people, and the climatic conditions are such that its immense area will remain undisturbed in the possession of its savage occupants, man and beast.

The subject of the agricultural resources of the country will, however, form the topic of another chapter in this report.

THE FURS OF ALASKA.

Of the various industries of Alaska the fur trade is one that may be discussed in a satisfactory manner, because we have authentic records of shipments, prices, and management reaching to the beginning of this and even to the middle of the last century. At the Siberian ports of Okhotsk, Bolsheretzk, and Petropavlovsk regular and generally reliable registers were kept of all furs arriving from the east, including the islands as well as the coast of the American continent. The figures obtained from these records may safely be considered below rather than above the actual numbers, because, as the Russian Government exacted a tithe or other percentage from all shipments, some shippers endeavored to smuggle through as much as they could without reporting it.

Even at this late day it is possible to apply a check to the totals of importation of furs from the region now called Alaska, by comparing the same with equally authentic figures of transactions in furs and teas on the Chinese frontier, and at Irkutsk, the center of the trade of all Siberia.

Of the large number of furs, principally sea otter, that found their way to Europe or China directly in the vessels of American and English traders toward the end of the eighteenth century and in the beginning of the nineteenth we have full statements in the published journals of these vessels.

Only two instances of shipments of furs from Alaska to France are known—the famous expedition of La Pérouse, which touched this coast in the year 1788, and the trading venture by merchants of Marseilles, who sent out a ship under the command of Roquefeuille, in the year 1818. This French captain, who had sailed with the most sanguine expectations of opening a new field of operations to the venturesome traders of Marseilles, and of ultimately establishing a rival traffic to that of the East India Company, was doomed to disappointment. The poor

quality of his trading goods was one of the causes of his failure among Indians, who had for long years reaped the benefits of fierce rivalry between English, American, and Russian traders. He states in his own narrative that he looked upon the inferior grade of woolen goods with which he had been furnished in France as the chief cause of his ill-success in trading with the natives. He boasted, however, of the superior quality of French muskets, but as he confesses to having paid as much as a musket and 12 pounds of powder for a single sea-otter skin, it seems that he profited but little by the superiority of the article. After a summer's cruise among the islands of the Alexander Archipelago, Roquefeuille came to the conclusion that as a mere trader he could not succeed, and therefore followed the examples of the Americans in organizing a hunting expedition on joint account with Baranof, the chief manager of the Russian colonies. In this venture also he met with misfortune. Being fitted out with Aleutian hunters, he was compelled to sign an agreement to pay the sum of $200 for any native who might lose his life while in his employ, by drowning or at the hands of hostile natives. In the course of his expedition 26 Aleut hunters were killed by the Hydas, on Prince of Wales Island, and as the number of sea otters secured did not exceed 200, Roquefeuille left the port of Alaska somewhat disgusted, and reported that there was no field for French enterprise on the northwest coast of America.

The American and the English explorers and traders continued for many years to hunt sea otters with Aleutians and their bidarkas, furnished by Baranof and his successors, but as their operations were chiefly carried on along the coast of New Albion or California the results of these ventures do not fall within the scope of this report.

The English and the American sea captains who visited Prince William Sound and the Alexander Archipelago previous to Vancouver's voyage reaped the most abundant harvest of sea otters in that section of the territory, as many as 2,000 skins being secured by a single vessel in one season; and at the beginning of the present century Baranof estimated that 120,000 sea otters were carried away by "foreigners." The prices even at that early day were remarkably high, and we find instances of 10 and 12 blankets, and even $40 in cash, having been paid for a single skin. The Russians, who were compelled to transport all their trading goods across the Asiatic continent and then by ships from Okhotsk, were not slow to discover that it was impossible to compete in trade with their English and American rivals. The valuable animal was rapidly becoming extinct in the more accessible hunting grounds, and Baranof concluded to extend the old policy of hunting, in preference to trading, to the sea-otter ground of the southeast. He summoned large numbers of Aleuts and natives of Kadiak, with their bidarkas, and peremptorily ordered them to proceed to his new settlement at Sitka, hunting on the way. Parties composed of 600 and 800 canoes each set out upon this perilous journey of over a thousand miles, following the line of the coast. One-third of the fleet was lost on the way. Some of the natives were surprised by violent storms in crossing the open sea from one promontory to another, while others suffered death at the hands of hostile Indians of the mainland. Those who finally reached their destination were divided into smaller parties and sent out to hunt in the intricate inlets, streams, and forests of the country. Some never returned to report either their successes or their losses. The association of Siberian merchants organized in 1785 to carry on the fur trade of the North Pacific had the favor of the Empress Catharine, but the first formal charter was granted by the Emperor Paul in 1799. When hunting in that region became no longer profitable the Russian-American Company continued to purchase of the Indians a few sea otters killed by them, but owing to the vicinity of the Hudson Bay Company the prices paid for these skins were exceedingly high. While the Aleut and Kadiak Innuit who were compelled to hunt for the company received but $10 for the very best grade of sea otter, the independent Thlinket sold the same quality for $30 and $40 at Sitka. The manager of the Russian company acknowledged that no profit was derived in these transactions; that the skins were purchased only to prevent their acquisition by the Hudson Bay Company.

On the Aleutian islands the killing of sea-otters was brought into system and order as soon as the Russian-American Company obtained control of the country by their charter in 1799. At first the company claimed the right to employ the Aleutian hunters in the pursuit of the sea

otter without any compensation beyond their subsistence, as an offset to their exemption from imperial taxes and other duties. This profitable but unjust procedure was abolished by the Emperor Alexander I, and the company was instructed to pay the Aleutian hunters for every skin deposited in the company's storehouses. The Emperor's manifesto was complied with, but the price paid to the Aleutian hunters for sea-otter skins was ridiculously small, only 10 rubles of colonial scrip or leather currency being paid to the hunter for a first-class skin, and he was required to furnish his own subsistence, with the exception of a few articles of luxury—a very small quantity of flour and tobacco. Even in those early times the Russian-American Company realized from $50 to $100 for their skins in the markets of Asia and Europe.

When the Russian hunters and traders first advanced from the coast of Asia along the Aleutian chain of islands the expeditions fitted out by Siberian merchants, consisting of one or two small vessels, were generally absent from five to seven years, and at the end of that time returned with from 2,000 to 7,000 sea-otter skins. Their primitive crafts were of such wretched construction that fully 50 per cent of these valuable cargoes were lost by shipwreck. In spite of these losses, however, the value of sea-otter and fur-seal skins imported through the port of Okhotsk was estimated at the end of the eighteenth century at nearly 2,000,000 rubles per annum, of which the Imperial Government exacted one-tenth as royalty from the hunters. Under the indiscriminate slaughter of many rival hunting expeditions the sea otter disappeared rapidly, and when the Russian-American Company at last obtained exclusive control of the whole business the annual catch did not exceed 1,500 skins for nearly half a century succeeding their first charter, and at no time during the existence of the company was it officially reported as exceeding 2,000. The policy adopted by the Russian company was to hunt thoroughly over a certain sea otter ground for two successive years and then let it remain undisturbed for three years following, but even under this careful management the total catch did not increase to the figure attained since the transfer of the country to the United States. Certain islands and their outlying rocks were more prolific in the valuable animals than they are at present, but the total yield of sea-otter skins is now five or six times what it was then.

It is true that we find such entries as the following in the records of the custom-house of Okhotsk in a single year: "The ships of the promyshleniks discharged at the custom-house in the year 1770 16,000 sea-otters, 23,000 sables, 2,400 black foxes, 14,000 red foxes, 25,000 fur seals, 36,000 blue foxes, valued at 2,000,000 rubles, and the traders estimate the value of goods given in exchange at 200,000 rubles;" but it must be remembered that the entries of that one year may have been the result of the transactions of several ships during four or five years.

The imperial chamberlain, Rezanof, who visited the Russian colonies in America between 1805 and 1807, estimated the value of sea-otters exported annually from the colonies at 80,000 rubles. Somewhat later, in 1817, the artist Choris, who accompanied Kotzebue in his voyage around the world, reported the annual catch of this valuable animal as worth from 100,000 to 150,000 rubles. The official reports of the company, however, showed a much smaller estimate; but it is safe to state that from the time of Kotzebue's visit to the Russian colonies until their transfer to the United States no less than 2,000 sea-otters were placed in the market every successive year, and also that to those shipments alone was due the maintenance of Russian colonies on this continent.

Of the profits accruing to the Russian-American Company from this traffic, from 300,000 to 400,000 rubles were annually disbursed to employees in the colonies, but nine-tenths of this sum was ultimately carried to Russia, only a small fraction finding its way into the hands of the natives of the country. At present the change in the way of conducting the business is so great as to leave 50 per cent of the value of furs, at the lowest calculation, in the Territory. On the other hand, the value of furs shipped from the Territory is also vastly increased.

In scanning the tables appended to this chapter the reader may easily trace the decrease or increase of sea-otters from year to year, and the great discrepancy between the yield of the present and of former time can not fail to attract his attention. The remarkable increase of shipments in our time is due solely to the increased inducements to the natives to exert themselves to the utmost in order to satisfy the new wants growing upon them every year. The

animal certainly existed in the same numbers in former times, but whenever a large body of them moved from one feeding ground to another no effort was made to trace or follow them up as is done now. As far as can be ascertained the greater slaughter of the sea-otter has not reduced the number existing in the Alaskan waters to any perceptible extent, and at present the shipments increase from year to year. In due course of time, however, the collapse must come, and the black cloud of prospective ruin and starvation is even now rising within the poor Aleut's limited scope of vision.

At an early day in the history of the Russian colonies in America transactions in the skins of fur-seals began to rival in magnitude those in sea-otter skins. During the year immediately succeeding the discovery of the Pribylof group, in 1786, over 500,000 fur-seals were killed by the Russian hunters (Veniaminof makes these figures 2,000,000), and the animals were almost extirpated from the islands. Fully one-half of the skins taken during that period were thrown into the sea in an advanced stage of putrefaction, poisoning the waters around the island to such an extent as to drive away the seals for several seasons. It was soon discovered that the Chinese merchants of the Siberian frontier placed a high value upon these skins, frequently refusing to exchange their teas for any other equivalent, but when the Russian-American Company obtained its exclusive privileges the fur seals were so nearly extinct that the company's traffic in their skins was at first quite insignificant. The chamberlain, Rezanof, above mentioned, was the first to observe the threatened extinction of the trade, and promptly applied the remedy by prohibiting the killing of seals for a period of five years. At the end of that time the shy animals had returned and multiplied sufficiently to afford a regular and reliable source of revenue. On the Pribylof Islands, as on the Aleutian group, the company paid native hunters for each skin secured, but the price was out of all proportion to the value, 40 and 50 cents each being all the poor Aleut obtained for skins worth then $40 in the Chinese market. Under the circumstances it was natural that these poor fellows did not relish life on the barren, desolate islands, and frequently asked to be relieved by other laborers.

These seal islands were early looked upon by the Russian managers as an unfailing treasury from which to draw in times of need. At the beginning of this century, when breadstuffs and other provisions were shipped to the colonies through Siberia, frequently failing to arrive at the proper time, the chief manager, Baranof, was obliged to purchase whole cargoes of goods and provisions from the English and American traders, and, having no money on hand for such transactions, he hit upon the expedient of paying in fur-seals, a currency always at hand when needed. At first this mode of payment was profitable enough, the captains accepting each skin as an equivalent for a Mexican dollar. These transactions becoming known, expeditions were fitted out in England and at New York and Boston with the sole view of exchanging cheap provisions for fur-seals at Sitka and then selling the latter at an immense profit in Chinese ports. The managers of the Russian company in St. Petersburg heard of this traffic and ordered the shipment of seal skins to China direct on account of the company, but being continually in want of provisions the manager of the colonies could not always comply with his instructions, though he succeeded in raising the price of skins from $1 to $2.

An end was finally put to these transactions by a peremptory order from St. Petersburg to make no further payments in fur-seals. The reason for this order was a very sharp transaction on the part of a Yankee trader who had sold a cargo of provisions to Baranof at Sitka, receiving fur seals at the rate of $1 each in payment, and then crossed over to Kamchatka with his ship and sold the skins to the agent of the same company at that place for $3 each.

At the time of Pribylof's discovery of the seal islands they were found to be uninhabited, and the vast numbers of seals shipped during the first decade succeeding were killed by laborers from Oonalashka and Athka islands hired for a period of years. These Aleuts were engaged at a fixed annual salary, being relieved from time to time by others, generally at their own request. It will thus be seen that from the very beginning the Russians recognized no proprietary rights to the fur seals as vested in the Aleuts. Subsequently, when the Russian-American Company assumed control, these laborers were allowed, and even compelled, to remain for longer periods of time, sometimes for a whole generation, as the company by its charter became sole owner of

everything within the limits of the Russian colonies in America; and, consequently, every fur-bearing animal killed by the natives was considered as killed for the company, payment being made in the shape of compensation for the natives' time or labor. The paragraph in the imperial charter of the company defining its rights invested that organization with full proprietary title to "all products of the sea and land, including even birds of the air, and whatever might be found in the interior of the earth."

In 1805, as already mentioned, the seal islands were visited by Rezanof and Langsdorff. The former did all in his power to arrest the indiscriminate slaughter of seals by removing one-half of the men engaged in killing, and prohibiting shipments of skins for five years thereafter. Langsdorff, on the other hand, in his voluminous reports called the attention of the Imperial Government to the threatened extinction of fur seals, making the rather remarkable statement that 30,000 seals had been killed for food by the laborers on the islands, the skins being thrown away; and also that he had observed in the month of May a school of fur seals moving southward and covering the surface of the ocean for a distance of 2 nautical miles. Langsdorff presumed that this abnormal movement, entirely at variance with the habits of the animal, was caused by the indiscriminate onslaught of Aleut hunters on the islands of St. Paul and St. George.

The measures adopted by Rezanof certainly proved effective, as only ten years later Kotzebue stated that from these two seal islands the Russian-American Company derived the most regular and ample revenue in all its vast possessions. The skins that had accumulated on the islands previous to Rezanof's arrival had been most carelessly cured by a crude process of drying over fires. Of 60,000 skins shipped from there to Canton by the ship *Neva*, 30,000 were thrown overboard within a day's sail of Canton in an advanced stage of putrefaction. Gradually, however, improvements were introduced in the management of the business and in the processes of curing and packing. The art of preparing sealskins for the market by plucking and dyeing was an invention of the Chinese, reported by the Russian-American Company's agent at Okhotsk as early as 1799. The exact date at which this process was adopted by English furriers can not now be ascertained, but it is safe to presume that it was early in the present century, as a regular demand for these skins in England can be traced to that time.

At a later period—about the year 1850—shipments directly to New York were made, and these continued at the rate of from 5,000 to 10,000 skins every year until the transfer of the territory.

When the acquisition of the Russian colonies was advocated before Congress no mention was made of any trade in fur-seals, but the annual average of fur seal shipments from the Pribylof Islands to England, the United States, and China from 1820 to 1867 was 42,000 skins, or an aggregate of 1,974,000 in forty-seven years.

It is not easy to explain why the Russians failed to work this "seal mine" to its full capacity. In the reports of the agents on the islands to the chief manager at Sitka subsequent to 1820 we find a constant repetition of the statement that the seals were increasing in number, accompanied by a request for permission to kill a number of old seals for the purpose of obtaining oil from their blubber, and in one instance this request was granted, and in a year or two after the discovery of gold in California, when fur-seal oil sold in San Francisco at $4 per gallon. The skins of these oily old patriarchs were of no value.

It is, however, altogether due to the excessive care exercised by the Russian authorities that the fur-seals did not become extinct on the islands during the years intervening between the sale of the territory and the passage of the act of Congress making the Pribylof group a Treasury reservation.

By that time the accumulation of seals had become too great to be affected by the killing of over a million within three years. The present limitation to 100,000 seals per annum was based upon the most careful observations and estimates; but it has long since become evident that, as far as any danger of extirpation is concerned, the number might safely be doubled. A change of fashion may take place at any time and depreciate, at least temporarily, the product of these islands; the beauty and durability of the material, however, are such as to insure its consumption

to some extent among the votaries of fashion for an indefinite period, and just so long Alaska can be made a valuable possession without reference to any other sources of wealth that may be developed within its boundaries.

The sea-otter is an exceedingly shy and sensitive animal and does not congregate in any great numbers, rarely setting foot upon the shore, unless it be for a few hours of repose upon some outlying rock or bar, and probably during the breeding season in some secluded retreat. It is found 60 and 80 miles from land, singly and in pairs; and even females with their young may be seen drifting about at that distance. Patches of floating kelp are their favorite resting places, and in still weather the female can be seen floating on her back, holding her offspring. Some hunters with well-developed ears or vivid imagination assert that the animal gives forth a crooning sound or lullaby, hushing the baby, as it were. During a very cold winter (in 1879–80) some sea otters came ashore in Cook Inlet.

In former times the Aleutian hunters prepared themselves for sea-otter expeditions by fasting, bathing, and other ceremonies. The sea otter was believed to be possessed of a very strong aversion to the female sex, and consequently the hunter was obliged to separate himself from his wife for some time prior to his departure, and also to prepare the garments he was to wear, or at least to wash with his own hands such of his garments as had been made by women. On his return from a successful hunt the superstitious Aleut of former times would destroy the garments used during his expedition, and before entering his hut dress himself anew from head to foot in clothing prepared by his faithful spouse during his absence. The hunting garments were then thrown into the sea. One old man stated in explanation of this proceeding that the sea otters would find the clothing and come to the conclusion that their late persecutor must be drowned, and that there was no further danger. With the spread of the Christian religion among the sea-otter hunters most of these superstitious ceremonies were abolished, but even at the present day the sea-otter hunter occupies a prominent position in the community and enjoys great social advantages. Anything he may want which is not in the possession of his own family will be at once supplied by his neighbors, and weeks and even months are spent in careful preparation of arms, canoes, and implements.

The mode of hunting the animal has not essentially changed since the earliest times. A few privileged white men located in the district of Ounga employ firearms, but the great body of Aleutian hunters still retain the spear and in a few instances the bow and arrow. The sea otter is always hunted by parties of from four to twenty bidarkas, each manned by two hunters. From their village the hunters proceed to some lonely coast near the hunting ground, either in their canoes or by schooners and sloops belonging to the trading firms, a few women generally accompanying the party to do the housework in the camp. In former times, of course, this was not the case. The tents of the party are pitched in some spot not visible from the sea, and the hunters patiently settle down to await the first favorable day, only a smooth sea permitting the hunting of sea otter with any prospect of success. In the inhospitable climate of Alaska weeks and months sometimes pass by before the patient hunters are enabled to try their skill. A weatherwise individual, here yclept "astronome," generally accompanies each party, giving due notice of the approach of favorable weather and the exact time when it is best to set out, and few Aleuts are bold enough to begin a hunt without the sanction of this individual. At last the day arrives, and after a brief prayer the hunters embark fully equipped, and in the best of spirits exchange jokes and banter until the beach is left behind; then silence reigns, the peredovchik or leader assumes command, and at a signal from him the bidarkas start out in a semicircle from 50 to 100 yards distant from each other, each hunter anxiously scanning the surface of the water, at the same time having an eye upon the other canoes. The sea-otter comes up to the surface to breathe about once in every ten minutes, the smooth, glossy head remaining visible but a few seconds each time. As soon as the hunter spies an otter he lifts his paddle as a signal and then points it in the direction taken by the animal, and the scattered bidarkas at once close in a wide circle around the spot indicated by the fortunate discoverer. If the animal comes up within this circle the hunters simply close in gradually, beating the water with their hands to prevent the escape of the quarry; but very often the wary animal has changed its direction after diving, and

the whole fleet of canoes is obliged to change course frequently before the final circle is formed. As soon as the otter comes up within spear's throw one of the hunters exerts his skill and lodges a spearhead in the animal, which immediately dives. An inflated bladder is attached to the shaft, preventing the otter from diving very deep. It soon comes up again, only to receive a number of other missiles, the intervals between attacks becoming shorter each time, until exhaustion forces the otter to remain on the surface and receive its death wound. The body of the animal is then taken into one of the bidarkas and the hunt continues if the weather is favorable. On the return of the party each animal killed is inspected by the chief in the presence of all the hunters and its ownership ascertained by the spearhead that caused the mortal wound, each weapon being duly marked. The man who first struck the otter receives from $2 to $10 from the owner. The skins of the slain animals are at once removed, labeled, and classified according to quality by the agents of the trading firms, and carefully stored for shipment. It frequently happens that a whole day passes by without a single sea-otter being sighted, but the Aleut hunters have a wonderful patience and do not leave a place once selected without killing some sea-otters, be the delay ever so long. There are instances where hunting parties have remained on barren islands for years, subsisting entirely on algæ and mussels cast from the sea. On the principal sea-otter grounds of the present time, the island of Sannak and the neighborhood of Belkovsky, the hunting parties seldom remain over four or five months without securing sea-otters in sufficient number to warrant their return. Single hunters have sold sea-otters to the value of $800 as their share of such brief expeditions, but payment is not made until the return of the party to their home station.

As soon as the result of a day's hunt has been ascertained the chief or leader reminds the hunters of their duty toward the church, and with their unanimous consent some skin, generally of a small animal, is selected as a donation to the priest, all contributing to reimburse the owner. The schools also receive donations of this kind, and the skins thus designated are labeled accordingly and turned over to the trading firms, who place the cash value at the disposal of the priest. Rivalry in the business of purchasing sea-otter skins has induced the various firms to send agents with small assortments of goods to all the hunting grounds, as an inducement to the members of parties to squander some of their earnings in advance.

The method of killing the sea-otter is virtually the same in all sections frequented by it.

The killing of fur-seals is accomplished entirely on land, and has been reduced almost to a science of the greatest dispatch and system. The able-bodied Aleuts now settled upon the two islands of St. Paul and St. George are, by the terms of the agreement between themselves and the lessees, the only individuals permitted to kill and skin the seal for the annual shipment as long as they are able to perform the labor efficiently within a given time. For this labor they are remunerated at the rate of 40 cents per animal. Life-long practice has made them expert in using their huge clubs and sharp skinning knives, both implements being manufactured expressly for this use. These men are as a class proud of their accomplishments as sealers, and too proud to demean themselves in doing any other kind of work. For all incidental labor, such as building, packing, loading and unloading vessels, etc., the lessees find it necessary to engage laborers from the Aleutian Islands, these latter individuals being generally paid at the rate of $1 per diem.

The work connected with the killing of the annual quota of fur-seals may be divided into two distinct features, the separation of the seals of a certain age and size from the main body and their removal to the killing ground forming the preliminary movements, the final operation consisting of another selection among the select, and killing and skinning the same. The driving as well as the killing can not be done in every kind of weather, a damp, cool, cloudy day being especially desirable for the purpose.

As it is the habit of the young male seals up to the age of four years to lie upon the ground back of the so-called rookeries or groups of families that line the seashore, the experienced natives manage to crawl in between the families and the "bachelors," as they were named by the Russians, and gradually drive them inland in divisions of from 2,000 to 3,000. It is unsafe to drive the seals more than 5 or 6 miles during any one day, as they easily become overheated and their skins are thereby injured. When night comes on the driving ceases, and sentries are posted

around each division to prevent the animals from straying during the night, occasional whistling being sufficient to keep them together. In the morning, if the weather be favorable, the drive is continued until the killing ground is reached, where the victims are allowed to rest over night under guard, and finally, as early as possible in the morning, the sealers appear with their clubs, when again small parties of 20 or 30 seals are separated from their fellows, surrounded by the sealers, and the slaughter begins. Even at this last moment another selection is made, and any animal appearing to the eye of the experienced Aleut to be either below or above the specified age is dismissed with a gentle tap of the club, and allowed to go on his way to the shore, rejoicing at its narrow escape. The men with clubs proceed from one group to the other, immediately followed by the men with knives, who stab each stunned seal to the heart to insure its immediate death. These men are in turn followed by the skinners, who with astonishing rapidity divest the carcasses of their valuable covering, leaving, however, the head and flippers intact. Only a few paces behind the skinners come carts drawn by mules, into which the skins are rapidly thrown and carried away. The wives and daughters of the sealers linger around the rear of the death-dealing column, reaping a rich harvest of blubber which they carry away on their heads, the luscious oil dripping down their faces and over their garments.

The skins, yet warm from the body, are discharged into capacious salt-houses and salted down for the time being like fish in bins. This treatment is continued for some time, and after the application of heavy pressure they are finally tied into bundles of two each, securely strapped, and then shipped.

The process by which these unsightly, ill-smelling bundles are transformed into the beautiful fabrics of fashion is described briefly in a letter written by a leading furrier of New York, from which I extract the following:

> When the skins are received by furriers in the salt the latter is washed off and the fat removed from the inside with a beaming-knife, great care being taken that no cuts or uneven places are made in the pelt. The skins are next thoroughly cleansed by being stretched upon beams with the fur side up, and then a careful removal of grease or other matter attached thereto. The next step in the proceeding is a stretching of pelts upon frames and drying the same over a moderate heat. After the drying process they are soaked in water and thoroughly washed with soap. After this the fur is dried again, the pelt being kept moist, and the operator pulls out the long hair with the assistance of a dull knife. The operation—a very delicate one—is repeated several times, until nothing but the soft fur remains. The skins are then dried again and dampened on the pelt side, and shaved until a fine, even surface is obtained. Then follows the slow and tedious process of working, drying, and softening the skins by treading them with bare feet in a hogshead, with fine hard-wood sawdust to absorb the grease. In dyeing, the liquid dye is put on with a brush, carefully covering the points of the standing fur. The skin is then pulled so as to make the points touch each other for some little time, and partially dried. The dry dye is removed and another coat applied, and the same process is repeated a number of times. A few of the coats of dye are put on, heavily pressed down to the edge of the fur; from eight to twelve coats produce a good color. The skins are then washed again and cleansed with sawdust. The English process is said not to include the washing after dyeing.

The manner in which the proceeds of the joint labor of all the sealers are divided among them is quite worthy of attention, and in its way solves to some extent the problem of communal labor. The introduction of this rather complicated system was founded upon measures adopted by the promyshleniks, or the companies of Siberia of the last century. As an example the division of proceeds on St. Paul Island alone in the year 1879 is presented: The sum total of joint earnings was first ascertained; next the number of claims upon the fund—that is, the families, individuals, and institutions to be supported—was definitely settled. Special donations were next in order, these consisting of gifts to three chiefs or superintendents of the labor of $150 each, $100 each to two men connected with church service, and one annual donation of $450 to the parsonage of Oonalashka. The remainder was divided among the church of St. Paul, the priest of that church, 64 actual laborers and heads of families, and 14 invalids and widows, the latter being divided into three classes according to their wants.

The church, priest, and able-bodied men are entitled to what are called first-class shares in the proceeds, the others receiving second, third, and fourth class shares respectively. The total number of participants in the distribution of earnings by shares in the year 1879 was 82, counting the church and priest at two shares each. The sum total of earnings was in that instance divided by 82, in order to ascertain the value of one first-class share. The value of a second-class share

was ascertained by deducting 10 per cent from the first-class share, and the same rule was followed as to the third and fourth classes. In the reduction of three classes of shares a sufficient sum is left to cover all the special gifts above mentioned. In the year referred to the division was as follows: The total earnings of sealers on St. Paul Island were $32,153.40; first-class shares, 68, of $410.75 each; second-class shares, 6, of $369.67 each; third-class shares, 6, of $328.60 each; and 2 fourth-class shares of $287.52 each. The special gifts conferred by unanimous consent of the community, aggregating $1,100, have already been mentioned above. The same rules are observed in dividing the earnings of sealers on the island of St. George, where the catch rarely exceeds 20,000 per annum and the value of shares is somewhat smaller.

No better plan could be devised by experienced political economists to provide in a just and equitable manner for all the members of an isolated community cut off from all the means of support but the one secured for them by the government.

It is evident that the shipments of both sea-otters and fur-seals have more than doubled since the transfer of the Russian colonies to the United States. An official statement, made in 1863, concerning the shipments of sea-otters from Sitka during the period of twenty years preceding, places the aggregate at 25,899, or an annual production of 1,295. At the present date the number approaches 6,000. The distribution of the sea-otter is somewhat changed, but I know of only one hunting ground where the number secured annually was greater in the past than it is now; that is on the island of Attoo, which, during the twenty years mentioned, produced 2,421 sea-otter skins, or 121 per annum, against 14 or 16 now obtained on the island each year. In the district of Kadiak and the Shumagin Islands the yield has been increased, while at the same time sea otters have made their appearance in large numbers at the southern end of Cook Inlet, where they were nearly exterminated almost a century since.

The increase in seals does not extend to the Commander Islands, still under Russian control.

Of land furs the records now available are less satisfactory with regard to the past. We have, however, an official statement covering the same twenty years—from 1842 to 1862—in which skins of foxes of three kinds (black, cross, and red), and from all sources, are reported as numbering 77,847, or 3,892 per annum; those of the arctic fox, 54,134, or 2,706 per annum; beaver, 157,484, or 7,874 per annum; land-otter, 70,473, or 3,523 per annum; marten, 12,882, or 644 per annum; bear, 1,893, or less than 100 per annum. That this official statement was far below the actual yield is made probable by the fact that at the present day, after forty years of hunting and trapping, the yield of land furs is greater by many thousands of each species. The only fur-bearing animal of this class that has decreased in numbers in our times is the beaver; and this is not due to the effects of hunting or trapping, but to several seasons of extraordinary cold, during which the submarine entrances to the beaver huts were closed by ice and the animals starved inside.

The marten or sable, though inferior to the Siberian species, is quite valuable, but the supply is limited. Whether it ever existed in larger numbers is difficult to ascertain, because the Russian company did not ship them from the colonies, but gave or sold them to the higher classes of its employees. Under the present rule of permitting only natives of the soil to hunt and trap, the balance between supply and consumption seems to be well preserved. No complaints are heard of the extinction of any fur-bearing animals, with the one exception of the beaver. As the whims of fashion change the prices of certain kinds and qualities of furs, traders induce the natives to secure those kinds in preference to others, and thus discrepancies arise in the annual catch, but this makes no difference as to the total. The fact that game, such as moose and reindeer, has been killed off to a great extent in the regions furnishing the principal land furs would lead us to expect that the natives, deprived of their natural food supplies, would be compelled to purchase largely imported provisions of the traders, and hunt more actively to provide means for the purchase. As far as can be observed, this is the case only with regard to flour, though they seem to spend now for food money that which was formerly squandered in beads and gaudy clothing unsuited to their mode of life. If extinction of fur-bearing animals in the continental region of Alaska should take place in the future, it will be due entirely to the constant drain from the arctic shore, where the Eskimos are constantly exchanging furs for whisky and

other intoxicating liquors, drawing largely upon furs obtained from their neighbors in the interior as far south as the Yukon, for which they receive no return but the means of stupefying themselves for days and weeks, and perhaps a breech-loading rifle, which becomes useless in their hands as soon as the fixed ammunition is expended. The fur-bearing animals on the immediate seacoast are almost exterminated or of little value, but the equivalent return of supplies of alcohol must be obtained, and, as a consequence, a traffic with their southern neighbors is carried on by these people, on the principle of buying furs for a little whisky and selling them for a larger quantity, the evils of this system working in both directions.

THE DISTRIBUTION OF THE FUR-BEARING ANIMALS IN ALASKA.

The fur seal (*Callorhinus ursinus*).—The only hauling or breeding grounds of the fur seal known in Alaska are on the islands of St. Paul and St. George, with the addition perhaps of the adjoining otter island, where these animals occasionally haul up, but do not breed. From early spring until late in the autumn fur seals are met with in all portions of the North Pacific inclosed by the Alaska coast, from latitude 50° 40′ to Mount St. Elias, and thence westward along Prince William Sound, the east side of Kenai Peninsula, and along the Aliaska Peninsula and its continuation, the Aleutian chain of islands. In Bering Sea the animal has not been observed to the northward of latitude 58°. In the spring of the year only fur seals are found in large numbers in the vicinity of the Strait of Fuca and along the coast of Vancouver and Queen Charlotte islands. During the time of the general migration to and from the breeding grounds several of the passes through the Aleutian chain are crowded with adults in the spring and with young seals and yearlings in the late summer and autumn. The presence of large numbers of these animals in these secluded waters and those of Prince William Sound late in the season (in June and July) has often given rise to the supposition that some breeding grounds must exist in those localities, but the most minute and persistent search has failed to sustain the supposition.

About 50 miles south of the Aleutian chain large numbers of seals are frequently seen during the summer, and for half a century rumors of the existence of breeding grounds in that neighborhood were launched from time to time.

The Russian-American Company fitted out numerous exploring expeditions, but these were always unsuccessful. The last enterprise of the kind was undertaken by a former employee of the Russian company, under the auspices of the present lessees of the seal islands, on the schooner *John Bright*, in 1873, being the third expedition of the kind fitted out by the Alaska Commercial Company in two years. On this occasion indications of land, such as are accepted by all navigators, were not wanting in the waters included in the search. After a season of fruitless search the captain finally abandoned his undertaking, coming to the conclusion, however, that within a short distance southward from the Aleutian Islands there existed banks sufficiently shallow to serve as feeding grounds for the seals, which possibly visit them for that purpose even during the breeding season, as a journey of 300 miles is but a brief excursion for these rapid swimmers in search of food.

All other expeditions in search of the supposed "winter home" of these seals have met with the same lack of success. The Pacific Ocean and the Antarctic have been scoured by the sealers and by emissaries of trading firms, but at the present day the fact seems to be established that the fur-seals, after leaving their confined breeding places, scatter over the broad Pacific to localities where extensive elevations of the bottom of the sea enable them to subsist upon fish until the instinct of reproduction calls them again from all directions to one common goal.

The sea-otter (*Enhydra marina*).—The sea-otter seems to exist chiefly on a line parallel with the Japanese current from the coast of Japan along the Kurile Islands to the coast of Kamchatka, and thence westward along the Aleutian chain, the southern side of the Aliaska Peninsula, the estuaries of Cook Inlet, and Prince William Sound, and thence eastward and southward along the Alaskan coast, the Alexander Archipelago, British Columbia, Washington Territory, and Oregon.

At the beginning of the present century large numbers of these animals were also found on the coast of California, from which they have now disappeared altogether; and on the coast of

Oregon, Washington, and British Columbia they have decreased to such a degree that only at long intervals is the patient hunter rewarded with the prize of one of these valuable skins. On the west coast of Vancouver Island, in the vicinity of Nootka Sound, where Meares, Portlock, Dixon, and others of the earliest English northwest traders found thousands of sea-otter skins in the possession of chiefs, the animal has been almost exterminated, and there can be no doubt that had it not been for the protection afforded under the Russian monopoly for nearly three-fourths of a century, this animal would be extinct to-day in Alaskan waters. The Innuit tribes alone entered understandingly into the measures of protection introduced by the Russians. The Thlinket, on the other hand, a fierce and savage people, opposed to system and order or control of any kind, were the most active agents in the extermination of the animal. From the time they began to understand the value of sea-otter skins, from the eagerness with which the early English visitors purchased all they had, even mere scraps and rags, the Thlinket all along the coast, from the mouth of Copper River southward, hunted and slaughtered the sea-otter indiscriminately and in the most clumsy manner, frightening away as many as they killed. Had these tribes joined to their recklessness the same skill and patient persistence observed among the Eskimo and Aleut there would be no sea-otters on that coast to-day; but in their wooden canoes they can only hunt in fine weather, and at such times the sea otter retires from the coast to a distance which no Thlinket would venture.

In the Russian possessions about the Kurile Islands and the coast of Kamchatka but a few hundred sea-otters are now killed annually. At three different times during the existence of the Russian-American Company their agents on the Kurile Islands and Kamchatka reported the sea-otter as extinct, and each time the animals appeared again after they had not been hunted for a few years. Along the Aleutian chain the sea-otters frequently change from one feeding ground to another; for instance, for a long series of years the island of Attoo and several smaller surrounding islands furnished many hundreds of sea-otter skins every year, but for some unexplained reason a migration eastward took place, and at the present time from 14 to 20 skins are all that the poverty-stricken inhabitants sell to the traders. The numerous islands between Attoo and Atkha are each visited in turn by the hunters about once in three years, and under such management the numbers of the animals appear to remain the same. The outlying reefs of Atkha, which once furnished the most abundant supply of these valuable skins, are now entirely deserted, and the inhabitants undertake long hunting voyages to the westward under convoy of schooners belonging to the trading firms.

From the island of Oumnak eastward the sea-otter becomes more frequent until we find it in its greatest abundance in the district of the Sannakh and Belkovsky. Here, within a radius of not more than 50 miles, over 2,000 sea-otters are secured every year by the fortunate hunters without any apparent decline in numbers. From this point in a northeasterly direction the coast of the Aliaska Peninsula is lined with hundreds of islands and reefs, affording ample facilities for shelter and refuge to the persecuted animal, and though it is hunted here recklessly by white men and native hunters alike, using firearms in violation of existing regulations, no alarming decrease can be ascertained from statistics at hand. Still farther northward, in the waters of the Kadiak Archipelago and the southern half of Cook Inlet, and thence eastward to Prince William Sound, sea-otters are found in less number than in the district described above, but still in comparative abundance, the annual yield being between 1,000 and 1,500 skins.

As far as it is possible for us to know, the only enemy of the sea-otter is man, with the exception, perhaps, of the so-called "killer whale." We have reports of natives only in support of the last statement, but as this whale is known to make sad havoc among fur-seals there is no reason to doubt that they occasionally attack the somewhat larger sea-otter. Skins have come under my observation marked with scars produced evidently by the teeth of some large marine mammal.

The distribution of the sea-otter along the coast of Alaska, as indicated in the accompanying map, has not essentially changed within historic times. Certain localities have been abandoned by the animal altogether, others temporarily; but where Bering, Chirikof, and Steller, and subsequently the Russian promyshleniks found the sea otter more than a century ago, we find it

now, and the supply of such skins in the fur markets of the world is certainly as great now as at any time since the first indiscriminate slaughter prior to the establishment of the Russian monopoly; in fact it is apparently much greater.

The land-otter (*Lutra canadensis*). The land-otter is one of the most widely distributed fur-bearing animals in Alaska, ranking in this respect next to the common cross fox. The skin, however, is much more valuable, since of late it has been utilized for the manufacture of an imitation of seal skin. The skin has always met with ready sale in Russia, where it is used extensively for collars and cuffs of the uniforms of army officers of the line, who cannot afford the more expensive sea-otter trimmings. The demand for it in former times was so great that the Russian-American Company, in leasing a strip of land to the Hudson Bay Company, was not only willing but anxious to accept payment in land-otter skins. The Chinese also have a liking for this fur.

The land-otter is found on the whole coast of Alaska, from the southern boundary to the northern shore of Norton Sound. It also occurs on all the islands inside of these limits as far as Oonimak in the west and Nunivak in the north. Within the Arctic circle the land otter is confined to the upper courses of rivers emptying into Kotzebue Sound and the Arctic Ocean, such as the Colville, the Kok, the Inland, and Selawik. It is found also along the whole course of the Yukon as far as known, along the Kuskokwim, and all over the delta lying between the mouths of these rivers, in the valleys of the Togiak and the Nushegak, and in nearly all parts of the Aliaska Peninsula and Oonimak Island, as well as on the Kadiak Archipelago, the shores of Cook Inlet, on the Kinik and Sushitna rivers emptying into the same, on Prince William Sound, and on the Copper River. The traders report the land otter also along the whole coast from Mount St. Elias to the southern boundary, with the exception of the smaller islands.

The Beaver (*Castor fiber*).—The beaver was once one of the most important among the fur-bearing animals of continental Alaska, but both in supply and demand a great decline has taken place during the last half century. It would seem that the smaller demand would cause an increase in the supply, but this has not been the case. Throughout the whole interior region north of Cook Inlet and south of the Yukon River the beavers have frequently suffered from excessive and prolonged cold during the winter, the ice in rivers and ponds forming so rapidly and to such thickness that the animals found it impossible to keep open the approaches to their dwellings under water, and they died of starvation before the thaws of spring opened their prisons. The Indians of the Kinik and Tanana rivers state that after an extraordinarily cold winter they have frequently found the putrefying carcasses of hundreds of beavers in their so-called lodges. Thousands of old beaver dams all over the continental portion of Alaska also testify to the former abundance of the animal, which now is thinly scattered over the same ground. At nearly every trading post throughout Alaska, where beaverskins are at all secured, hundreds are purchased now where thousands appeared on former records.

The northern limit of the beaver seems to be but little to the southward of that of the land otter—considerably above the Arctic circle—being identical with the limit of trees. Skins are obtained from the natives living on the northern tributaries of the Yukon River, which have passed into the hands of the latter from the head waters of the Colville and other rivers emptying into the Arctic.

All the streams emptying into Kotzebue Sound are still inhabited by the beaver, and it is found on the east shore of Norton Sound, along the whole course of the Yukon and its tributaries, among all the lakes and streams of the Yukon and Kuskokwim deltas, in the lake and river systems of the Togiak and the Nushagak, about Lake Ilyamna and the lakes and rivers of the Aliaska Peninsula down to a line identical with that forming the northern boundary of the Aleutian tribe. On the shores of Cook Inlet and the rivers emptying into the same the beaver is still comparatively plentiful, especially in the vicinity of the large lakes occupying the central portion of the Kenai Peninsula. Beaverskins are also obtained from the natives occupying the head waters of the Copper River and the series of lakes connecting the river with the Kinik and the Sushitna rivers.

In the southeastern section of Alaska, west of Mount St. Elias, traders report the existence

of the beaver on streams and rivers of the mainland, but it is probable that most of the skins obtained in that vicinity come really from the British possessions, whence all these rivers flow.

In the past, when the Hudson Bay Company reigned supreme throughout the beaver country of northwestern America, the skins of these animals represented in trade the value of an English shilling each, and were used and accepted as common currency. Within the Russian possessions the value was always somewhat higher, and at the present time the price of a beaver-skin of average size in Alaska is from $1.50 to $2, according to weight.

The Indians of the interior and a few of the Eskimo tribes look upon the meat of the beaver as a great delicacy; it is a dish that is always set before honored guests, and is much used during festivities. The long incisors of the beaver form an important item in the domestic economy of the natives who hunt this animal, the extraordinary hardness of these teeth making it possible to use them in the manufacture of chisels, small adzes, and other tools used in the working of wood and bone. Under the rule of the Russian-American Company the exportation of castoreum was quite extensive, but now that article meets with no demand outside of the Chinese market, the Celestials still looking upon it as a valuable part of their materia medica.

The brown bear (*Ursus richardsonii*).—The brown bear of Alaska, a huge, shaggy animal varying in length from 6 to 12 feet, is distributed over nearly every section of Alaska, but seems to prefer an open, swampy country to the timber. The northern limit of this animal is about latitude 67° north, where it is found on the head waters of the rivers emptying into the Arctic, and occasionally on the streams emptying into Kotzebue Sound and in the interior of the Kotzebue Peninsula. Being an expert fisher, the brown bear frequents during the salmon season all the rivers emptying into Bering Sea and the north Pacific and their tributaries as far as the fish will go, and at the end of the annual run of fish the animal retreats into the recesses of hills and tundra, where berries and small game are most plentiful. The banks of all the streams are lined on either side with the well-trodden trails of these huge animals, offering better facilities for the progress of the traveler than do the paths of men. The brown bear is the great roadmaker of Alaska, and not only are the swampy plains intersected with paths made by him in all directions, leading generally to the easiest fording places of streams and rivers, but the hills and ridges of mountains to the very top show the traces of the omnipresent traveler. He shows great judgment and local knowledge, for his road up the mountain is as safe to follow as is the most practicable route. In greatest numbers this animal is found in the region between the Lower Kuskokwim, the Togiak, and the Nushagak rivers, and also on the Aliaska Peninsula and the island of Oonimak. The island of Kadiak is full of this species of bear, but the largest specimens are shipped from the coast of Cook Inlet. The skin of a bear that had been killed in the vicinity of the Kenai Mission during last summer (1880), which I measured, was 14 feet 2 inches in length. On the steep sides of the volanic range of mountains, on the west side of Cook Inlet, brown bears can be seen in herds of 20 or 30. Their skins are not very valuable, and, owing to this fact and to the fierce dispositions of the animals, they are not commonly hunted. All natives of Alaska respect them, and it is the universal custom of hunters to address a few complimentary remarks to the intended victims before attempting to kill them. Perhaps the skins of fully one-half of the brown bears killed throughout Alaska are retained by the natives for bedding and to hang before the entrances of houses in the place of doors. The smaller skins are tanned and cut up into straps and lines, and the natives of the interior utilize them for manufacturing sledge fastenings and the network bottoms of snowshoes, because this leather does not stretch when exposed to moisture as moose and deer skins do.

The black bear (*Ursus Americanus*).—The black bear of Alaska is widely distributed over the continental portion of the territory, but is generally confined to regions of timber and mountains; as far as known, it exists only on a few islands in Prince William Sound and on Kaiak Island. The northern limit of the black bear extends, according to observations made by Mr. E. W. Nelson, even beyond that of his brown cousin. It is said to exist farther down the rivers emptying into the Arctic, and to be quite plentiful thence southward to the valley of the Yukon. The western limit of the region where the black bear is found is perhaps a line drawn from the Selawik River southeastward to Nulato, and thence across to the Kuskokwim River in the vicinity of Kalma-

kovsky. From the Upper Nushagak many skins are obtained, and one trader reports black bear even west of this line, on the lower left bank of the Kuskokwim and on the Togiak Peninsula, but as that region is not timbered the statement appears doubtful. From Bristol Bay eastward the black bear is confined to the timbered regions about Lake Ilyamna, but is more plentiful on the coast of Cook Inlet and in the interior of the Kenai Peninsula. From the head waters of the Yukon, Tanana, Sushitna, Kinik, and Copper rivers many black-bear skins are brought down to the seacoast, and from Prince William Sound and eastward the mountains and forests harbor large numbers of these animals. These skins command high prices and are still increasing in value, but the animals are shy, and to hunt them requires much time and patience. The natives do not fear them in the least, and, in fact, it is considered the work of boys to kill them. Owing to its value, probably, the natives never use the black-bear skin for bedding. The glossiest and largest of these skins come from the St. Elias alpine range and the vicinity of Prince William Sound; but the black bear never attains the size of the brown variety.

The red fox (*Vulpes fulvus*).—The only fur-bearing animal found in every section of Alaska is the red fox. From Point Barrow to the southern boundary, and from the British line to the island of Attu, this animal is ever present. It varies in size and quality of its fur from the finest Nushagak variety, equal to the high-priced Siberian fire fox, down to the diminutive, yellow-tinged specimen that rambles furtively over the rocky islands of the Aleutian chain. Its color gives variety among the uniform snow-white robes of its polar cousin along the Arctic shore, and with the unwelcome persistency of a poor relation it mingles with the aristocratic black and silver foxes, always managing to deteriorate in course of time the blood and coating of the "first families." Mountain or valley, forest or swampy plain, all seem to be the same to him. The red fox seems perfectly indifferent in regard to his diet; fish, flesh, and fowl being equally to his taste, with such little entremets as shell-fish, mussels, and eggs of aquatic birds. He has an advantage over his fellows in the fact that his skin is cheap, and the natives do not eat his flesh except as a last resort in times of famine. They hunt or trap the red fox only when nothing else can be obtained; the interior tribes, however, make winter garments of their skins.

Being an inveterate and intrepid traveler, the red fox is not above making an occasional sea voyage on the ice, which explains his presence on all the islands of the Aleutian chain, the Shumagin group, and even on St. Lawrence and the Pribylof islands, over a hundred miles from any other land. It is a common practice among both Innuit and Indian tribes in the north to make household pets of young foxes whenever they can be secured alive. The average price of red-fox skins throughout the country is about $1.

The black or silver fox (*Vulpes fulvus*, var. *argentatus*) *and the cross fox* (*Vulpes fulvus*, var. *decussatus*).—The king among the various tribes of the *vulpes* family is the black or silver fox. He is found in his prime in the mountain fastnesses of the interior and on the head waters of the larger rivers. Here he appears of large size, with long, soft, silky fur, varying in color from a silver tint to a deep, jet black, the latter being the most rare and highly valued. These two qualities are found principally in the mountains on the boundary between southeastern Alaska and British Columbia, in the country of the Chilkats and the Takoos, on the Upper Copper River, the Kenai Peninsula, and on the Sushitna and Kinik, the Upper Yukon, Tanana, and Kuskokwim rivers. In the last-named regions the traders pay from $10 to $15 for each skin, but in southeastern Alaska, where competition is more fierce, as much as $40 or $50 in coin are frequently paid for a single skin. Along the Yukon and its northern tributaries the black fox of an inferior quality is found almost on the seacoast and on the shores of Norton Sound and in the interior of Kotzebue Peninsula. The animal is also reported to exist on the head waters of the Colville River up to the sixty-eighth degree of latitude. Black foxes are quite plentiful on Kadiak Island, and they occur on the Shumagin group, Oonimak Island, and on most of the Aleutian Islands as far as Athka, but to many of these points they have been imported through the agency of man. On the timberless highlands of the far west the fur of these animals seems to deteriorate in quality.

Another species of the fox family is generally found with the silver fox, forming, in fact, the connecting link between the red plebian and the black aristocrat. This is the cross fox,

partaking of the distinguishing qualities of both the red and black, evidently the result of unrestrained intermixture. The quality and the color of the fur of the cross fox come much nearer those of the red, and the skin of the former exceeds that of the latter but little in value—from $2 to $3 being paid for the best of them. While the distribution of the cross fox is naturally almost identical with that of the silver variety, the animal is found farther westward on the Aleutian Islands, and is more frequent on the Aliaska Peninsula, though on the islands of Prince William Sound and on Kaiak Island both the black and cross varieties exist.

The skins of silver foxes form the most important element in the trade of the whole Yukon basin, being almost the only high-priced skins found in that vicinity, but they are by no means numerous. The only section of Alaska where these animals are of the best quality and in large numbers at the same time is in the mountains about the Chilkat and Takoo rivers, and there the reckless competition leaves but little margin for profit.

The Arctic fox (*Vulpes lagopus—blue and white*).—Of the Arctic fox we find in Alaska 2 varieties—one white and the other a bluish gray, commonly called "blue fox" by the traders. The white fox is found along the coast of continental Alaska from the mouth of the Kuskokwim northward to Point Barrow and the eastern boundary. Its fur is of a snowy white, especially in the young, and both soft and long, but, owing to the lack of durability, it does not command a high price in the market.

The animal is very numerous northward of Norton Sound, and not at all shy. Natives and travelers alike report instances of the fearlessness with which these foxes enter their camps, and even dwellings, in search of food or out of mere curiosity. A large portion of the skins secured by Eskimo and other natives are used by themselves for trimming their garments, and the remainder falls chiefly into the hands of whalers and whisky smugglers, so that it is impossible to obtain accurate figures as to the annual catch. They may be called omnivorous, and they refuse nothing that will fill their stomachs. I observed one sleek and apparently well-fed specimen which devoured nearly the whole of a large salmon, and afterward worried down with considerable difficulty a thick leather strap with a heavy buckle attached to it. In the depth of winter the natives find it unsafe to leave any article of clothing, dog harness, or boat material within their reach.

The blue fox exists now on several of the Aleutian Islands, where it was found by the first discoverers in 1741. The animal is also found on the Pribylof Islands, and here, where it has been possible to protect the species against intermixture with other and inferior foxes, the skins are of the finest quality, commanding a high price in the market. Traders report the existence of the blue fox to a limited extent in the vicinity of Oogashik, on the Aliaska Peninsula, and also on the lower Kuskokwim; and it occurs also on the delta between the mouths of the Yukon and the Kuskokwim. Captain Hooper, of the revenue marine, who commanded the United States steamer *Corwin* during two successive cruises in the Arctic, reports that he saw blue foxes at Cape Espenberg, Elephant Point, Hotham Inlet, Point Hope, Point Belcher, and Point Barrow. The same gentleman also states that he "found the blue fox much more plentiful on the Siberian than on the American coast, and that all the blue foxes in the far north are so inferior to those on the islands of Bering Sea as to suggest the possibility of their being a different species." Even on the Arctic coast Captain Hooper saw blue foxes, taken at the same time and place, differing very much in the color and quality of the fur. On the Pribylof Islands from 1,000 to 1,500 of the best quality of blue-fox skins are annually shipped, and several hundred of a little inferior quality from Attoo and Athka Islands, but it is impossible to ascertain the quantity obtained along the Arctic coast by whalers and illicit traders.

The mink (*Putorius vison*).—The Alaska mink is distributed almost as widely as the red fox, but does not extend to the islands. It is most plentiful in the vast tundras or mossy marshes of the lower Yukon, Kuskokwim, Togiak, and Nushagak basins. The skin is of very little value; the Russian-American Company did not purchase it at all, and even now the trade in this article is confined chiefly to the natives, who manufacture it into garments or use it for trimming. No more than 10,000 or 15,000 of these small skins are exported annually. The northern limit of the mink is but little south of the Arctic coast, and from thence southward it is found everywhere

throughout the continent until its southern and western limits are reached on the Aliaska Peninsula on a line between Cape Stroganof and Sutkhum Island. The only islands on which minks are found to exist are those in Prince William Sound and perhaps some of those in the Alexander Archipelago. No skins of this kind shipped from any portion of Alaska equal in quality or value those of British Columbia, Washington Territory, and Oregon; the traders simply buying them for the sake of accommodating their customers. The region about Togiak River and lakes, which furnishes scarcely any other fur than mink, has for that reason been entirely neglected by traders. Until a year ago no white man had penetrated into the recesses of the tundras, and the inhabitants, having no intercourse with civilized men, are still in their primitive condition of barbarism. The natives living on the Yukon and Kuskokwim deltas are called "mink people" in derision by their neighbors—a term equivalent to beggar.

The marten (*Mustela americanus*).—The limits within which the marten is found throughout Alaska are almost identical with those of standing timber. The animal is found occasionally as far north as latitude 68°, and inhabits the valleys of the Yukon, Kuskokwim, and Nushagak rivers from the head waters down as far as timber exists, on the wooded mountain ranges of Cook Inlet and the Kenai Peninsula. On the Chugatch alps, the Copper River range, and the St. Elias alps martens are plentiful and of the finest quality. Very fine skins of this kind are also purchased by the traders in southeastern Alaska; a portion of these probably being obtained from the British possessions. The Alaskan marten or sable is inferior to the Siberian fur of that name ("sable" is simply a corruption of the Russian word for marten, "sobol," and is by no means a distinct animal). The Russian-American Company considered the Alaska sable of so little value that they did not export it at all from the colonies, but sold the whole catch to officers and employees of the company. The price set upon these skins under those circumstances was small, indeed, being only 10 cents each. After the transfer of the territory a demand for them arose, and in a few years of competition raised the price to $4, $5, and even $6, much to the delight of the astonished natives; but the inferiority of the article soon made itself felt, and reaction set in until at the present day the price of marten-skins in northwestern Alaska does not exceed $1.50, though in the southeastern section excessive competition still keeps up a higher figure.

A few more fur-bearing animals existing in Alaska may be mentioned, but they are not of sufficient importance to deserve more than a passing notice. The polar bear is found only on the Arctic coast, where ice in large bodies exists, and with the moving ice fields he enters and leaves the waters of Bering Sea. The number of skins annually secured forms but a very small item in the bulk of trade.

The lynx is found only in the wooded mountains of the interior on the Kenai Peninsula, and the St. Elias range of mountains, the skins being used chiefly for carriage robes and trimming, but the fur is not durable.

Wolves, both gray and white, are found but are rarely killed.

Muskrats exist all over Alaska, but the skins are at most valueless and but few are shipped away.

Rabbits and marmots are killed only for their flesh, and occasionally the natives use the skins of the latter for the garments of the poor.

Wolverines are rarely exported, as they find a ready market among the inhabitants of the coast region of the Yukon and Kuskokwim divisions, who prefer this shaggy piebald fur to any other trimming for their garments.

EXPORTS OF FURS FROM ALASKA.

The first authentic list of fur shipments from Russian America was compiled at the beginning of the present century by Lieut. Vassili Berg, of the Russian navy, who having access to all the archives of Petropavlovsk, Nishnekamchatsk, Bolsheretzk, and Okhotsk, included in his list all the importations from America from 1745 to 1797, with the exception of one cargo, containing nearly 4,000 sea-otter skins (the ship *Vladimir*, Captain Zaïkof, in 1779). With the year 1797 the systematic operations of the Russian-American Company began, though their charter was not promulgated until a year or two later, and from that time forth official tabulated statements of

furs shipped from the colonies were published from time to time. Other tables can be found in the works of various authors and travelers, but it is safe to state that, generally speaking, the totals thus furnished were below the actual yield of furs. These tables, furthermore, do not include the large shipments of sea-otter furs from the Alexander Archipelago by American and English traders at the end of the last and the beginning of the present century, aggregating at least 20,000 or 30,000 skins.

The transactions of Baranof, the first chief manager of the Russian-American Company, who paid for many ships' cargoes of provisions and trading goods in fur-seal skins, were also ignored, and no account was kept of losses by the frequent shipwrecks, and through carelessness of subordinate employees. Thus, in one instance, the captain of the ship *Nadaishda*, in 1805, was obliged to throw overboard 30,000 fur-seal and several hundred sea-otter skins, which were found to have reached an advanced stage of putrefaction in the hold of the vessel. The naturalist, Langsdorff, who accompanied Lissiansky in his voyage around the world, learned from the sealers stationed on St. Paul Island that they had killed at least 30,000 fur seals for their blubber only, the skins having been thrown into the sea for lack of time, hands, and fuel to cure them.

The incompleteness of the official Russian returns is easily demonstrated by comparison. One of these reports, covering the period from 1821 to 1842, gives the total shipments of furs as follows: Of sea-otter 25,416, or an annual average of 1,210; of fur-seal 458,502, or an annual average of 21,833; and of beaver 162,034, or an annual average of 7,716. Another partial report, yet also official, covers seven years of the same period, but shows results quite different. The annual average computed from the latter would be 1,407 of sea-otter, 18,880 fur-seal, and 5,711 beaver. The average annual yield in these furs, as computed from the company's official returns for the next twenty years, from 1842 to 1862, was 1,294 sea otter, 18,644 fur-seal, and 7,874 beaver.

Large quantities of furs formerly found their way from the Lower Yukon River and Norton and Kotzebue sounds to Siberia, through the hands of Chukche and Malemute traders, who obtained trading goods from Siberian merchants on the Anadyr and Indigirka rivers. These Alaskan furs were, of course, not included in any estimate, nor can I now give the number of skins purchased annually along the Arctic coast by the illigitimate traders who carry rum and breech-loading arms from the Hawaiian Islands and spread ruin and destruction along these ice-bound shores. From the persistency with which these men continue to assume the risks of this unlawful traffic it must be concluded that both its volume and profit are large.

From southeastern Alaska, also, large numbers of furs are carried into British Columbia, of which no record can be obtained, both natives and whites being there engaged in smuggling them across the frontier. All this goes to show that all returns of Alaska's yield of furs always have been and necessarily must be below rather than above the reality.

The annexed tabular exhibit of fur shipments from Alaska since its first invasion by Siberian fur traders has been compiled from records found in the archives of the Russian-American Company, from Russian official reports and other publications, and from the books of the San Francisco custom-house, supplemented by statements furnished by the few firms engaged in the Alaskan trade. This table shows strikingly the extraordinary increase in the number of furs purchased annually since the transfer of Alaska to the United States. This discrepancy may, however, be only apparent to a certain extent, and could probably be much reduced were the means at hand of ascertaining the reliability of Russian returns. The officials of the Russian-American Company were disposed to conceal the actual extent of their transactions, as the company, during the later period of its existence, was constantly striving to obtain a reduction of or relief from the vast expenditure (for administrative and protective purposes) imposed upon it by the imperial charter. Another factor in the deficiency of returns may be found in the dishonesty of subordinate employees of the Russian company, who filled their own pockets at the expense of the shareholders. It was, however, the accepted policy of the managers of the corporation to keep the wants of the natives within the narrowest possible limits, and thereby to reduce as far as practicable the quantity of merchandise required for the colonial trade, which had to be shipped around the world at an enormous expense. Since the transfer of the country, on the other hand, and since the breaking up of the monopoly, the rival traders have vied with

each other in dazzling the eyes of fortunate hunters with a lavish display of costly articles of luxury and delicacies for the palate, exciting them to the utmost exertion in the pursuit of fur-bearing animals.

Summary of furs shipped from Russian America and Alaska from 1745 to 1880.

By whom shipped.	Sea otter.	Fur seal.	Land otter.	Beaver.	Fox.					Bear.		Mink.	Marten.	Muskrat.	Wolverine.	Lynx.	Wolf.
					Black.	Cross.	Red.	Arctic.		Black.	Brown.						
								Blue.	White.								
UNDER RUSSIAN RULE.																	
Siberian traders, 1745 to 1797	96,047	417,758	1,679	.....	10,421	15,147	14,961	62,361	.....	....	.....	.....	.....	.....	.....	.....	....
Shelikhof Company, 1786 to 1797	15,647	139,266	3,360	428	4,625	5,222	5,704	600	.....	....	.....	.....	200	.....	.....	.....	....
Russian-American Company, 1798 to 1821	86,644	1,767,340	17,768	56,001	15,112	24,535	35,456	45,904	5,130	....	2,650	5,345	17,921	.....	1,234	1,819	....
Russian-American Company, 1821 to 1842	25,416	458,502	29,442	162,034	17,913	26,462	45,947	55,714	13,638	....	5,355	15,481	15,666	4,491	1,564	4,253	201
Russian-American Company, 1842 to 1862	25,899	372,894	170,473	157,484	21,212	23,102	33,533	32,130	22,004	....	1,893	12,701	13,682	6,570	10	6,927	24
Russian-American Company, 1862 to 1867	11,137	198,718	21,816	37,409	14,310	7,942	12,316	8,082	5,119	....	590	690	918	3,180	78	4,012	116
Total Russian shipments	260,790	3,354,478	244,538	413,356	83,593	102,410	147,917	204,791	45,891	....	10,488	34,217	48,387	14,241	2,886	17,011	341
SINCE PURCHASE BY THE UNITED STATES.																	
By American traders, 1867 to 1871	12,208	338,965	6,367	17,041	2,310	6,214	31,714	4,419	4,312	121	1,910	32,100	24,311	17,908	.....	2,412	180
By American traders, 1871 to 1880	40,283	938,368	18,964	41,217	6,992	19,410	82,919	7,508	11,492	819	5,207	71,213	81,609	50,322	.....	6,312	421
Total American shipments	52,491	1,277,333	25,331	58,258	9,302	25,624	114,633	11,927	15,804	940	7,117	103,313	105,920	68,230	.....	8,724	601
Grand total	313,281	4,631,811	269,869	471,614	92,895	128,034	262,550	216,718	61,695	940	17,605	137,530	154,307	82,471	2,886	25,735	942

With the aid of the above table a computation may be made as to the average earnings of the native hunter in disposing of his furs to the traders. The returns from the southeastern division are incomplete and partly inaccessible, and therefore the calculation is confined to the people living west of the one hundred and forty-first meridian.

During the ten years from 1870 to 1880 the purchases of furs by traders from natives aggregated as follows:

40,283 sea otter, at $60, worth	$2,416,980.00	5,207 brown bear, at $1.50, worth	$7,810.50
18,964 land otter, at $2.50, worth	47,410.00	71,213 mink, at 20 cents, worth	14,242.60
41,217 beaver, at $2.50, worth	103,042.50	81,609 marten, at $2, worth	163,218.00
6,992 black fox, at $15, worth	104,880.00	50,322 muskrat, at 5 cents, worth	2,516.10
19,410 cross fox, at $2.50, worth	48,525.00	6,312 lynx, at $2, worth	12,624.00
82,919 red fox, at $1, worth	82,919.00	421 wolf, at $1.50, worth	631.50
7,508 blue fox, at $2, worth	15,016.00		
11,492 white fox, at $1, worth	11,492.00	Total	3,033,764.20
819 black bear, at $3, worth	2,457.00		

Average for one year, $303,376.42, which sum divided between 3,000 families would give each an annual income of about $100 from this source. The earnings of the Arctic Innuit are not included in this calculation, their furs not appearing in the above list. Another exception is

the inhabitants of the Pribylof or fur-seal islands, who divide over $40,000 every year among less than 100 families. It is also necessary to state that about 400 families divide the proceeds of the whole sea-otter catch, amounting to from $250,000 to $300,000 per annum.

The official report of State Councilor Kostlivtzof, who was appointed in 1861 to investigate the affairs of the Russian-American Company, contains a table exhibiting the purchases of furs from natives of Alaska during a period of nineteen years, from 1842 to 1860, inclusive. This table is arranged by districts and stations, and has been transcribed in full from the Russian original so far as it confines itself to the limits of the present Alaska. The operations of the Russian-American Company embraced also a few localities not included in the transfer of territory from Russia to the United States.

Summary of furs purchased by the Russian-American Company in Alaska from 1842 to 1860.

Where purchased—station or district.	Sea otter.	Fur-seal.	Land otter.	Beaver.	Fox.	Arctic fox.	Bear.	Mink.	Marten.	Musk-rat.	Lynx.	Wolver-ine.	Wolf.
1842.													
Sitka	131	2	162	236	129	.....	168	631	182	68	14	11	4
Kadiak	342	.....	1,018	6,198	3,175	.....	136	37	.....	3,210	100	35	3
Ounga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	333	.....	58	.....	1,691	.....	.....	.....	.....	.....	.....	.....	4
Atkha	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Attoo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	7,600	.....	.....	.....	505	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	2,570	.....	.....	.....	1,491	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Michael	.....	.....	240	2,088	532	549	.....	73	58	300	36	.....	.....
Total	806	10,172	1,478	8,522	5,527	2,545	304	741	240	3,578	150	46	11
1843.													
Sitka	198	.....	241	328	101	.....	100	40	120	16	.....	9	7
Kadiak	294	.....	1,028	6,502	2,022	.....	122	60	861	.....	111	.....	1
Ounga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	281	.....	65	.....	1,583	.....	.....	2	.....	.....	.....	1	3
Atkha	281	931	.....	.....	.....	986	.....	.....	.....	.....	.....	.....	.....
Attoo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	10,236	.....	.....	.....	515	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	1,004	.....	.....	.....	1,377	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Michael	.....	.....	274	3,004	300	424	.....	.....	11	64	33	.....	.....
Total	1,054	12,171	1,608	9,924	4,006	3,302	222	102	992	80	144	10	11
1844.													
Sitka	81	.....	140	291	3	1	20	2	230	.....	3	11	1
Kadiak	191	.....	727	5,580	1,691	.....	54	96	346	6	27	56	4
Ounga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	267	.....	97	.....	1,147	.....	.....	.....	.....	.....	.....	.....	4
Atkha	387	756	.....	.....	237	1,109	.....	.....	.....	.....	.....	.....	.....
Attoo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	11,094	.....	.....	.....	394	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	830	.....	.....	.....	1,343	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Michael	.....	.....	250	3,180	278	174	2	.....	29	.....	5	.....	.....
Total	926	12,680	1,214	9,051	3,356	3,021	76	98	625	6	35	67	9
1845.													
Sitka	144	.....	164	192	80	.....	30	.....	262	.....	.....	14	9
Kadiak	343	.....	731	4,240	1,945	.....	88	78	574	145	63	57	6
Ounga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	335	.....	67	.....	1,134	.....	.....	.....	.....	.....	.....	.....	2
Atkha	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Attoo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	12,637	.....	.....	.....	365	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	1,000	.....	.....	.....	1,366	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	76	1,646	135	.....	3	.....	.....	.....	10	.....	.....
St. Michael	.....	.....	320	2,607	504	138	6	.....	149	.....	27	.....	.....
Total	822	13,637	1,358	8,685	3,798	1,869	127	78	985	145	100	71	17

Summary of furs purchased by the Russian-American Company in Alaska from 1842 to 1860—Continued.

Where purchased—station or district.	Sea otter.	Fur-seal.	Land otter.	Beaver.	Fox.	Arctic fox.	Bear.	Mink.	Marten.	Musk-rat.	Lynx.	Wolver-ine.	Wolf.
1846.													
Sitka	142	.....	158	107	78	.....	4	6	192	.....	.....	10	2
Kadiak	266	.....	418	4,855	628	.....	72	154	1,629	.....	124	101	6
Ounga	64	.....	74	.....	511	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	255	.....	5	.....	1,023	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	398	.....	.....	.....	61	1,788	.....	.....	.....	.....	.....	.....	.....
Attoo	91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	14,053	.....	.....	.....	528	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	1,017	.....	.....	.....	1,418	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	52	2,091	79	.....	10	.....	.....	.....	5	.....	.....
St. Michael	.....	.....	227	3,623	408	132	3	.....	47	.....	33	.....	.....
Total	1,216	15,070	934	10,676	2,788	3,866	89	160	1,868	.....	162	111	8
1847.													
Sitka	158	.....	119	58	29	.....	3	.....	51	.....	.....	11	1
Kadiak	251	.....	361	3,601	692	.....	69	101	1,585	152	151	55	.....
Ounga	214	.....	60	.....	421	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	186	.....	5	.....	1,746	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	87	.....	.....	.....	27	235	.....	.....	.....	.....	.....	.....	.....
Attoo	84	.....	.....	.....	.....	284	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	16,703	.....	.....	.....	515	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	1,000	.....	.....	.....	1,354	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	100	2,395	236	.....	8	.....	.....	.....	49	.....	1
St. Michael	.....	.....	179	3,404	293	161	5	.....	.....	.....	111	.....	.....
Total	980	17,703	824	9,458	3,444	2,549	85	101	1,636	152	311	66	2
1848.													
Sitka	95	.....	114	48	7	.....	10	54	55	.....	15	2	.....
Kadiak	397	.....	300	5,544	1,215	.....	109	74	948	60	178	19	4
Ounga	109	.....	66	.....	624	.....	.....	.....	23	.....	.....	1	.....
Oonalashka	230	.....	.....	.....	1,180	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	113	.....	.....	.....	19	130	.....	.....	.....	.....	.....	.....	.....
Attoo	91	.....	.....	.....	.....	274	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	13,630	.....	.....	.....	461	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	1,000	.....	.....	.....	1,298	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	75	1,949	333	.....	14	.....	.....	.....	20	.....	.....
St. Michael	.....	.....	207	2,749	469	13	3	20	96	490	110	.....	.....
Total	1,035	14,650	762	10,290	3,857	2,176	136	148	1,122	550	323	22	4
1849.													
Sitka	164	.....	136	623	33	.....	4	54	65	.....	10	6	.....
Kadiak	256	2	490	4,335	2,151	.....	60	75	1,276	146	269	69	4
Ounga	185	.....	74	.....	358	.....	.....	.....	.....	.....	.....	1	.....
Oonalashka	195	.....	7	.....	423	.....	.....	.....	.....	.....	.....	1	.....
Atkha	148	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Attoo	238	.....	.....	.....	.....	222	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	20,450	.....	.....	.....	519	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	1,000	.....	.....	.....	1,069	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	78	1,436	298	.....	8	.....	.....	.....	15	.....	.....
St. Michael	.....	.....	269	2,513	637	41	2	.....	175	.....	124	.....	.....
Total	1,186	21,452	1,054	8,937	3,900	1,851	74	129	1,516	146	418	77	4
1850.													
Sitka	260	1	128	430	105	.....	13	30	200	.....	9	9	.....
Kadiak	292	.....	400	4,679	2,145	.....	116	69	993	210	264	122	6
Ounga	236	.....	64	.....	339	.....	.....	.....	.....	.....	.....	.....	1
Oonalashka	239	.....	1	.....	680	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Attoo	298	.....	.....	.....	.....	170	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	6,270	.....	.....	.....	519	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	500	.....	.....	.....	1,073	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	73	1,077	285	.....	7	.....	.....	.....	28	.....	.....
St. Michael	.....	.....	124	2,505	793	24	22	.....	64	686	196	.....	.....
Total	1,358	6,771	790	8,691	4,447	1,786	158	99	1,257	896	497	131	7

Summary of furs purchased by the Russian-American Company in Alaska from 1842 to 1860—Continued.

Where purchased—station or district.	Sea otter.	Fur-seal.	Land otter.	Beaver.	Fox.	Arctic fox.	Bear.	Mink.	Marten.	Musk-rat.	Lynx.	Wolver-ine.	Wolf.
1851.													
Sitka	111	.....	65	462	22	.....	1	144	189	.....	.....	6	.....
Kadiak	416	.....	253	4,442	1,047	.....	99	.....	173	473	60	93	.....
Ounga	200	.....	39	.....	514	.....	.....	1	.....	.....	.....	.....	.....
Oonalashka	270	.....	2	.....	913	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	25	.....	.....	.....	90	126	.....	.....	.....	.....	.....	.....	.....
Attoo	21	.....	.....	.....	253	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	6,064	.....	.....	.....	517	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	500	.....	.....	.....	1,263	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	45	1,166	339	.....	.....	.....	.....	.....	19	.....	.....
St. Michael	.....	.....	157	3,169	259	12	1	29	67	692	106	.....	.....
Total	1,043	6,564	561	9,239	3,437	1,918	101	174	429	1,165	185	99	.....
1852.													
Sitka	46	.....	15	143	2	.....	.....	.....	24	.....	.....	.....	.....
Kadiak	155	.....	448	3,196	1,637	.....	65	.....	503	.....	14	80	5
Ounga	232	.....	68	.....	468	.....	.....	6	.....	.....	.....	.....	.....
Oonalashka	233	.....	3	.....	1,481	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	91	.....	.....	.....	34	243	.....	.....	.....	.....	.....	.....	.....
Attoo	123	.....	.....	.....	.....	294	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	6,225	.....	.....	.....	645	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	500	.....	.....	.....	1,477	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	54	1,732	62	.....	.....	.....	.....	.....	11	.....	.....
St. Michael	.....	.....	116	1,720	630	77	5	.....	46	1,152	24	.....	.....
Total	880	6,725	704	6,791	4,314	2,736	70	6	573	1,152	49	80	5
1853.													
Sitka	1	.....	.....	79	.....	.....	2	.....	.....	.....	.....	.....	.....
Kadiak	282	.....	248	6,179	589	.....	75	51	232	1,146	5	74	6
Ounga	242	.....	87	.....	517	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	299	.....	3	.....	1,167	.....	.....	.....	.....	.....	.....	.....	.....
Athka	4	.....	.....	.....	285	185	.....	.....	.....	.....	.....	.....	.....
Attoo	193	.....	.....	.....	.....	388	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	16,034	.....	.....	.....	641	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	2,601	.....	.....	.....	1,238	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	48	2,640	163	113	.....	.....	.....	.....	.....	.....	.....
St. Michael	.....	.....	250	3,174	451	30	3	70	122	568	15	.....	.....
Total	1,021	18,035	636	12,072	3,175	2,595	80	121	354	1,714	20	74	6
1854.													
Sitka	1	.....	.....	23	.....	.....	.....	30	21	.....	.....	.....	.....
Kadiak	390	1	438	654	1,534	.....	22	8	238	167	3	46	1
Ounga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oonalashka	208	.....	1	.....	721	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	9	.....	.....	.....	125	193	.....	.....	.....	.....	.....	.....	.....
Attoo	74	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	24,145	.....	.....	.....	624	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	2,000	.....	.....	.....	1,291	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	42	1,472	105	.....	.....	.....	.....	.....	1	.....	.....
St. Michael	.....	.....	442	3,855	288	4	3	1	254	.....	10	.....	.....
Total	742	26,147	923	6,004	2,773	2,112	25	39	513	167	14	46	1
1855.													
Sitka	3	.....	2	9	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kadiak	296	.....	253	6,837	735	.....	171	165	990	1,050	43	143	6
Ounga	673	.....	176	.....	646	.....	.....	.....	.....	.....	.....	1	.....
Oonalashka	338	.....	2	.....	820	.....	.....	.....	.....	.....	.....	.....	.....
Atkha	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Attoo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul Island	.....	6,584	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. George Island	.....	2,001	.....	.....	.....	1,123	.....	.....	.....	.....	.....	.....	.....
Kalmakovsky	.....	.....	67	965	12	.....	.....	.....	.....	.....	3	.....	.....
St. Michael	.....	.....	347	1,594	470	36	2	33	502	235	4	.....	.....
Total	1,346	8,585	847	9,405	2,683	1,159	173	198	1,492	1,285	50	144	6

Summary of furs purchased by the Russian-American Company in Alaska from 1842 to 1860—Continued.

Where purchased—station or district.	Sea otter.	Fur-seal.	Land otter.	Beaver.	Fox.	Arctic fox.	Bear.	Mink.	Marten.	Musk-rat.	Lynx.	Wolver-ine.	Wolf.
1856.													
Sitka				15									
Kadiak	251		506	2,176	1,015		59	3	886		76	39	
Ounga	193		64		138								
Oonalashka	215				344								
Atkha	86				71	159							
Attoo	325					280							
St. Paul Island		20,550				514							
St. George Island		3,000				1,145							
Kalmakovsky			88	1,161	260	99	16		450		10		
St. Michael			248	1,207	673	138	19	104	396	220	26		
Total	1,070	23,550	906	4,559	2,501	2,335	94	107	1,732	220	112	39	
1857.													
Sitka													
Kadiak	331		519	4,562	1,056		97	101	857	2,287	174	70	1
Ounga	273		49		290								
Oonalashka	403				641								
Atkha	3				11	33							
Attoo	176					180							
St. Paul Island		18,082				1,417							
St. George Island		3,000				1,198							
Kalmakovsky													
St. Michael			375	2,683	1,059	159			1,387	52	33	52	
Total	1,186	21,082	943	7,245	3,057	2,987	96	101	2,244	2,339	207	122	1
1858.													
Sitka													
Kadiak	169		442	3,120	1,364	17	76	42	1,002	2,880	208	73	4
Ounga	274		51		240								
Oonalashka	418		7		1,102								
Atkha	32				223	228							
Attoo	249					94							
St. Paul Island		29,810				558							
St. George Island		3,000				1,555							
Kalmakovsky			95	1,280	128	8	7		352		95		
St. Michael			286	1,449	506	150	24		1,394	69	53		
Total	1,142	32,810	881	5,849	3,563	2,610	107	42	2,748	2,949	356	73	4
1859.													
Sitka				32			5	22		4			
Kadiak	491		557	3,178	1,420		81	41	675	1,197	94	56	1
Ounga	359		44		250								
Oonalashka	443				1,005								
Atkha	106				195	125							
Attoo	279					5							
St. Paul Island		19,000				619							
St. George Island		3,000				1,296							
Kalmakovsky			103	1,717	757	63	10		346		52		
St. Michael			333	1,982	995	267	37		1,946	140	32	1	
Total	1,678	22,000	1,037	6,909	4,622	2,375	133	63	2,967	1,341	178	57	1
1860.													
Sitka			3	88	1		11	39	7	6			
Kadiak	396		421	5,413	1,988	12	26	20	527	1,184	36	68	
Ounga	357		63		305								
Oonalashka	478		6		870								
Atkha	49				42	245							
Attoo	259					59							
St. Paul Island		18,590				625							
St. George Island		3,000				911							
Kalmakovsky			79	969	398	37	10		950		9		
St. Michael			313	1,950	895	54	46		1,536		28		
Total	1,539	21,590	885	8,420	4,499	1,943	93	59	3,020	1,190	73	68	

Summary of furs purchased by the Russian-American Company in Alaska from 1842 to 1860—Continued.

RECAPITULATION.

Years.	Sea otter.	Fur seal.	Land otter.	Beaver.	Fox.	Arctic fox.	Bear.	Mink.	Marten.	Muskrat.	Lynx.	Wolverine.	Wolf.
1842.....	806	10,172	1,478	8,522	5,527	2,545	304	741	240	3,578	150	46	11
1843.....	1,054	12,171	1,608	9,924	4,006	3,302	222	102	992	80	144	10	11
1844.....	926	12,680	1,214	9,051	3,356	3,021	76	98	625	6	35	67	9
1845.....	822	13,637	1,358	8,685	3,798	1,869	127	78	985	145	100	71	17
1846.....	1,216	15,070	934	10,676	2,788	3,866	89	160	1,868	.....	162	111	8
1847.....	980	17,703	824	9,458	3,444	2,549	85	101	1,636	152	311	66	2
1848.....	1,035	14,650	762	10,290	3,857	2,176	136	148	1,122	550	323	22	4
1849.....	1,186	21,452	1,054	8,937	3,900	1,851	74	129	1,516	146	418	77	4
1850.....	1,358	6,771	790	8,691	4,447	1,786	158	99	1,257	896	497	131	7
1851.....	1,043	6,564	561	9,239	3,437	1,918	101	174	429	1,165	185	99	.....
1852.....	880	6,725	704	6,791	4,314	2,736	70	6	573	1,152	49	80	5
1853.....	1,021	18,035	636	12,072	3,175	2,595	80	121	354	1,714	20	74	6
1854.....	742	26,147	923	6,004	2,773	2,112	25	39	513	167	14	46	1
1855.....	1,346	8,585	847	9,405	2,683	1,159	173	198	1,492	1,285	50	144	6
1856.....	1,070	23,550	906	4,559	2,501	2,335	94	107	1,732	220	112	39	.....
1857.....	1,186	21,082	943	7,245	3,057	2,987	97	101	2,244	2,339	207	122	1
1858.....	1,142	32,810	881	5,849	3,563	2,610	107	42	2,748	2,949	356	73	4
1859.....	1,678	22,000	1,037	6,909	4,622	2,375	133	63	2,967	1,341	178	57	1
1860.....	1,539	21,590	885	8,420	4,499	1,943	93	59	3,020	1,190	73	68	.....
Total ..	21,030	311,394	18,345	160,727	69,747	45,735	2,244	2,566	26,313	19,075	3,384	1,403	97

A comparison of the total purchases according to the above table with the total shipments as exhibited for the corresponding period of time in Table I will reveal certain discrepancies that require explanation. For instance, the shipments of land-otter skins from 1842 to 1862 aggregated 170,473, while only 18,345 were purchased of the natives from 1842 to 1860. During this period the Hudson Bay Company rented from the Russian-American Company the strip of mainland lying back of the Alexander Archipelago, and, upon mutual agreement, the greater part of the rent was for many years paid in land-otter skins, purchased in various sections of the Hudson Bay Company's domains. These skins were then in great demand for the trimming of officers' coats in the Russian army, hence the large shipments in excess of what Russian America could supply.

Further comparison of the two tables demonstrates the fact that the skins of the marten (Alaskan sable) and of the bear were rarely exported under the Russian management, being disposed of chiefly to employees of the company, and in consequence of the limited demand these animals were not very extensively hunted.

A comparison of the quantity of furs purchased during the nineteen years included in the exhibit of the above table with the incomplete returns of shipments by American traders in thirteen years, from 1867 to 1880, the latter being necessarily below the real figures, is shown below:

Output of furs in Alaska.

Classes of fur.	From 1842 to 1860 (nineteen years).	From 1867 to 1880 (thirteen years).	Classes of fur.	From 1842 to 1860 (nineteen years).	From 1867 to 1880 (thirteen years).
Sea otter.....	21,030	52,491	Mink.....	2,566	103,313
Fur seal.....	311,394	1,277,333	Marten.....	26,313	105,920
Land otter.....	18,345	25,331	Muskrat.....	19,075	68,230
Beaver.....	160,727	58,258	Lynx.....	3,384	.....
Fox.....	69,747	149,559	Wolverine.....	1,403	.....
Arctic fox.....	45,735	27,731	Wolf.....	97	.....
Bear.....	2,244	8,057			

A contemplation of the above table may furnish food for reflection to United States officials, and might probably be of interest to the Russian Government.

The prices paid to natives for their furs have, of course, greatly increased since the admission

of unlimited competition to the field of operations. The subjoined comparative table of prices will present this:

Classes of fur.	Under Russian rule.	At present.	Classes of fur.	Under Russian rule.	At present.
Sea otter	$10.00	$60.00 to $100.00	Arctic fox (blue)	$0.80	$3.00 to 4.00
Land otter	.60	2.50 3.00	Arctic fox (white)	.20	2.00
Black fox	$2.00 to 3.00	10.00 40.00	Beaver	.60	2.00 3.00
Cross fox	.60	2.50 3.00	Mink	.05	.20
Red fox	.60	1.00 1.50	Marten (sable)	.10	3.00 4.00

Owing to competition the purchasing power of money has not decreased in Alaska in the same ratio as prices have increased. The natives in all accessible sections of the Territory are now enabled to purchase necessaries and luxuries of which they did not dream previous to the abolition of the Russian monopoly. The fur-seals of the Pribylof Islands were never purchased of the natives; the latter were paid only for the labor of killing and skinning the animal, as is now done by the present lessees of the islands under the terms of their lease from the United States Government.

The market value (London) of the annual yield of furs in western Alaska may be approximately stated as follows:

Classes of fur.	Number.	Price.	Value.	Classes of fur.	Number.	Price.	Value.
Sea otter	4,500	$100.00	$450,000	Bear, black	100	$5.00	$500
Fur seal	100,000	15.00	1,500,000	Bear, brown	711	2.00	1,422
Land otter	2,500	3.00	7,500	Mink	10,300	.30	3,090
Beaver	5,800	3.00	17,400	Marten (sable)	10,500	3.50	36,750
Black fox	920	30.00	27,600	Muskrat	6,800	.10	680
Cross fox	2,500	3.00	7,680	Lynx	870	3.00	2,610
Red fox	11,400	1.50	17,100	Total			2,081,832
Arctic fox (blue)	1,190	4.00	4,760				
Arctic fox (white)	1,580	3.00	4,740				

Adding to this $100,000 for the furs of southeastern Alaska, the greater part of which were sold in British Columbia, and the value of the annual fur yield of Alaska may be estimated at $2,181,832, which amount may be swelled a little by the Arctic fur trade, of which I have no returns.

This estimate, which is necessarily low, furnishes the best answer to the question whether the purchase of Alaska from Russia, considered from a financial standpoint, was a judicious measure.

THE FISHERIES.

Mr. Tarleton H. Bean, of the Smithsonian Institution, enumerates 75 species of food-fishes existing in Alaskan waters, over 60 of which Mr. Bean claims to be strictly adapted to the use of man, while the remainder come under the heading only as bait for catching the others.

Of the sea fishes the codfish stands foremost in quantity as well as in commercial importance.

Within a short time after the purchase of Alaska by the United States, Prof. George Davidson, of the United States Coast Survey, stated that the soundings of Bering Sea and of the Arctic Ocean north of Bering Strait indicated the largest submarine plateau yet known. In the eastern half of Bering Sea soundings of less than 50 fathoms are found over an extent of 18,000 square miles. The extent of the banks in the Gulf of Alaska, between longitude 130° and 170° and latitude 60° and 54°, has not thus far been estimated, but it is probably equal to that of the banks of Bering Sea.

In general terms it may be stated that the codfish is found around the whole south shore of Alaska. Its distribution on banks properly begins, however, with the Strait of Fuca, though it is found occasionally as far south as the Farrallones. A few schooners fish for cod in British

Columbian waters, especially near the Alaskan line. The fish is quite abundant in many of the channels of the Alexander Archipelago, and is found in Yakutat Bay, off the southern and western shore of Kaiak Island, in Prince William Sound.

The first large bank after crossing the southern boundary of Alaska is found in Chatham Strait, but another and smaller bank lies in Peril Strait, between Baranof and Chichagof islands. The next bank of general importance is the Portlock bank, located by the explorer of that name along the southeastern coast of Afognak and Kadiak islands. The soundings of this bank are from 45 to 90 fathoms. Some distance to the southeast of Kadiak, in latitude 56° 13′ and longitude 153° 30′, there is another bank, with soundings of from 22 to 28 fathoms.

More to the southward is found the Simeonof Bank, discovered in 1867, between latitude 54° 45′ and 54° 38′, longitude 158° and 158° 30′, with soundings averaging 40 fathoms, and about 20 miles east-northeast of Simeonof Island a little higher plateau is reported, with soundings of from 26 to 40 fathoms. The famous Shumagin Banks, of which the Simeonof Bank, perhaps, is an extension, are located around Nagai, Popof, and Ounga islands, within a short distance of the shore. Most of the shipments of codfish from Alaska to San Francisco are made from this vicinity, the banks heretofore named being worked almost exclusively for local consumption.

South of the Shumagins an extensive bank, with soundings averaging 35 fathoms, is known to exist in the vicinity of Sannakh Island, between latitude 54° 67′ and 54° 20′, longitude 161° 55′ and 162° 30′, and another large bank is reported off Oonimak Pass, in latitude 54°, longitude 166°, with soundings of 40 fathoms. Still farther to the southward, in the vicinity of Akutan Pass, a bank with soundings of 50 fathoms was reported in 1869.

A very prolific codfish bank exists inside of Captains Harbor, in Oonalashka Island, with shallow soundings of from 10 to 20 fathoms. The westernmost codfish bank definitely located in the Aleutian chain of islands extends from the south end of Oumnak Island into the North Pacific, with soundings of 30 fathoms, in latitude 52° 30′, longitude 168° 50′. Many more such banks exist in the vicinity of the Aleutian Islands and the eastern portion of Bering Sea, but these rich stores of food-fish will probably remain undisturbed for some time to come. Even the banks enumerated here are merely skimmed, as it were, of their abundant produce, the fishing being done chiefly "inshore," in dories, boats, and canoes, the schooners engaged in the business being employed almost exclusively as carriers of the catch.

The codfishery of Alaska may be considered as in its infancy. Since Captain Turner, of the schooner *Porpoise*, sailed from San Francisco in the spring of 1866, and returned in the same year, after a brief visit to Queen Charlotte Islands, Ounga, and the Shumagin group, with a cargo of marketable codfish, the industry opened by this pioneer has not developed in such a degree as might have been expected from the almost unlimited supply and the favorable location of the banks.

As has already been stated, no deep-sea fishing, such as is carried on in the North Atlantic, exists in Alaska. In the channels of the Alexander Archipelago the fishing for cod has until lately been confined altogether to the natives of the Thlinket tribes, who opposed all attempts of white men to compete with them in this particular industry. The few small sloops engaged in the business in this region depend altogether upon the inclination of these natives to exert themselves in obtaining their cargoes. These fishermen use their own appliances, fishing with bark lines and wooden iron-pointed hooks, and two men in a canoe feel satisfied with a catch of 30 or 40 fish, which they sell at a comparatively high rate to the captains of the sloops; and thus it happens that these crafts are frequently detained for many weeks awaiting a cargo that could easily have been secured within five or six days by white men.

In Prince William Sound the codfish is only caught by natives for their own consumption at a season when no other fish can be obtained in abundance. The fishing here is from canoes within a short distance of the shore, mostly in well-sheltered bays. Perhaps one-half of the catch is consumed fresh, while the other half is split and hung up to dry in the open air, without salting or smoking. In spite of the damp climate of this region the specimens of dried codfish that came under my observation were apparently well cured, quite palatable, and in a better condition than salmon or redfish treated in the same manner, the disagreeable taint which seems to be

inseparable from dried fish of the salmon family being scarcely perceptible in these specimens of dried codfish. As the codfish of Prince William Sound is now confined almost entirely to its northern shore, it is safe to state that the total annual consumption, both fresh and dried, does not exceed 30,000 or 40,000 fish.

In English Bay, on the southwestern extremity of the Kenai Peninsula, the natives fish for cod occasionally, but only when unfavorable weather prevents them from hunting outside of the limits of the bay. The cod here is all consumed fresh, and the total catch can not exceed 2,000 or 3,000 fish.

Proceeding from here southward to the islands of Afognak and Kadiak we meet a people partially subsisting upon codfish throughout the year. The Portlock Bank is within easy reach of all the settlements on the eastern shore of these islands, but only the most enterprising among the people, chiefly the creoles or half-castes, venture out to any distance in sloops built on the islands. The principal fishing is done close inshore in small boats and dories. The old men and the boys of the creole and Innuit families may be seen in their boats or canoes a mile or two from shore on almost any morning throughout the year, except when a furious northeaster keeps them at home. Nearly all this catch is intended for immediate consumption, as the inhabitants of this region do not dry any codfish. In the creole settlements of Afognak, Spruce Island, and in the vicinity of Kadiak fresh codfish, together with potatoes grown in their little garden patches, form the constant diet of the inhabitants throughout the year. In the harbor of St. Paul, the central settlement of this group of islands, the codfish is also prepared for exportation. The favorite ground for these fishermen is a flat with soundings from 15 to 20 fathoms, and here they average a daily catch of 200 fish per man. The shipments from this point to the California market have been thus far limited to small quantities of boneless fish put up in 30-pound boxes.

The only active codfish industry existing in Alaska is located about the Shumagin Islands, the firm of McCollam & Co., of San Francisco, having a permanent station at Pirate Cove on Popof Island. The force of this establishment consists of a foreman and eight fishermen, who go out in their dories during the day and dress their catch on shore in the evening. The fishermen who come up with the schooners from San Francisco generally ply their lines within easy reach of the harbors on Popof and Nagai islands. The average catch per man in this vicinity is also 200 fish, though catches of from 500 to 600 have been recorded.

Since the first opening of this industry on the Shumagin Banks the total annual catch has not exceeded 500,000 fish. The best results in dory fishing at Pirate Cove are obtained in the month of February. The schooner fishermen meet with good success from late in April until the middle of August, and the fishing on the deep banks of Simeonof Island is best in August and September. At the latter place it has been reported that 10 men caught 4,000 fish in one day, the average catch being from 1,600 to 1,800.

All the fishermen engaged in the vicinity of Kadiak and on the Shumagin Banks agree in the statement that the abundance of codfish is as great as ever, occasional fluctuations in the catch being due entirely to migration of the fish.

Careful investigations by Professor Jordan and Dr. T. H. Bean, of the United States Fish Commission, into the quality of the Shumagin cod have shown no essential difference between this species and that of the North Atlantic. The facilities for the pursuit of the industry are greater on the Pacific side than they are on the Atlantic. The journey from San Francisco or Puget Sound to the Shumagin Banks is comparatively brief and very safe, and the banks are within a few hours' run of numerous commodious harbors. In view of all these circumstances the conclusion is unavoidable that the great want of the Shumagin fisheries is not fish or safety to the fishing craft, but simply a demand for fish, and that a market such as the New England fishermen enjoy would whiten the vast extent of the Shumagin Banks with sails of all descriptions. The yield of codfish, so far as it could be obtained from the records of shipments to San Francisco for the last few years, is given in the subjoined table. In connection with this subject it may be mentioned that fully one-half, if not more, of the codfish brought to San Francisco is caught in the Sea of Okhotsk. The fish of the latter sea is not superior in quality, being caught early in the season and before reaching the best stage, and the quantity does not seem to exceed that

caught on the Shumagin Banks, while the average weight is somewhat less. The question arises, why do San Francisco fishermen go to the Okhotsk Sea at all? A question which must be left for future investigators to solve.

The shipments of codfish from the Shumagin Islands to San Francisco in the year 1880 consisted of seven cargoes, aggregating 432,000 fish and weighing 1,728,000 pounds. During the same year 725,000 fish were brought in five cargoes from the Okhotsk Sea, having been caught in Russian waters.

The cod fishing of the North Pacific has been carried on for sixteen years, with the following results:

Year.	Vessels.	Fish.	Year.	Vessels.	Fish.
1865	7	469,400	1874	6	381,000
1866	18	724,000	1875	7	504,000
1867	19	943,400	1876	10	758,000
1868	10	608,000	1877	10	750,000
1869	19	1,032,000	1878	12	1,190,000
1870	21	1,265,500	1879	13	1,499,000
1871	11	772,000	1880	8	1,206,000
1872	5	300,000	Total		12,952,300
1873	7	550,000			

Of this, three fifths, or 7,771,380 fish, came from the Okhotsk Sea, and the remainder, or 5,180,920, from Alaskan waters.

Salmon shipments aggregated somewhat over 3,000 barrels salted and 8,000 cases canned.

A peculiarity of the Alaska cod-fishing industry is that the fish is not cured in the vicinity of the banks. The cod is only cleaned and pickled on board of the carrying craft, taken down to San Francisco and there pickled anew, being finally taken out and dried in quantities to suit the demands of the market. Expert fishermen located on the Shumagin Islands and at Kadiak claim that the fish could be cured on the spot as well as it is done at Cape Ann and other Atlantic cod-fishing stations. It is difficult to understand the reason for the process adopted by these San Francisco firms. The repeated pickling certainly does not serve to enhance the quality of the Shumagin codfish, and it is probably owing to this fact that the Eastern codfish commands a higher price in the markets of the Pacific coast.

Another deep-sea fish of importance in Alaskan waters is the halibut. It exists all along the coast from British Columbia northward and westward, and also in the deep harbors and straits of the Aleutian chain of islands. Among the natives of the Alexander Archipelago the halibut is a very important food staple, being obtainable throughout the year.

The Thlinket fishermen exhibit great patience and skill in catching this huge, flat fish, which often attains a weight of several hundred pounds in these waters. It is consumed in immense quantities, both fresh and smoked, in all the villages and settlements inhabited by Thlinket tribes. Along the coast inhabited by Innuit tribes and about the Aleutian islands the halibut does not exist in the same abundance, and the whole supply is consumed fresh.

The only attempt thus far made in Alaska to preserve halibut for exportation is reported from the Klawak fishing establishment, on Prince of Wales Island. It is doubtful whether anywhere in Alaska outside of the southeastern division a sufficient quantity of halibut exists to warrant fishermen in making a special business of their catch.

In order to furnish an adequate idea of the immense consumption of fish in Alaska it becomes necessary to discuss each division separately in this connection.

1. *Southeastern Alaska.*—This division has a population of over 7,000 inhabitants, all of whom depend more or less upon fish for subsistence. This population consists almost entirely of natives engaged in catching and curing various kinds of fish throughout nearly the whole year; and even during the hunting season, when fur-bearing animals are in their prime and all the able-bodied male adults are busy in their pursuit, the old men, women, and youths of both sexes remain in the villages situated upon the seashore, fishing whenever the weather permits.

Though the variety of fish is great in this region, halibut and salmon always form the basis of supply. In the Sitka market may be seen, in addition, at the various seasons, several species of rock fish, trout, cod, and herring, while mussels and clams are also abundant. The halibut is here caught exclusively with bark lines, and hooks of peculiar construction. The hook consists of two pieces of wood, fastened together at one end with strips of spruce root so as to form an acute angle with each other, an arm of the angle being furnished with a bent pointed piece of iron. The wood is generally carved to represent some animal or fish, and the bait, usually herring, is tied on so as to cover not only the hook but also the wooden shaft on which the hook is fastened. The halibut will gulp down the bait, opening its jaws wider and wider, the short arm of the hook being constructed so as to leave only a narrow space between it and the iron point, thus admitting of the motion necessary to fasten the fish while preventing its escape. A halibut thus held with its mouth wide open will soon be drowned and can be easily secured. This Indian style of halibut hook seems to be more effective than that of civilization. Set lines, each provided with one hook, a stone sinker, and a buoy consisting of an inflated bladder or the stomach of a seal, with a small signal or flag attached to indicate when the fish is hooked, are in common use, and are generally set in 10 or 20 fathoms of water around the numerous islands of Sitka Bay.

In the open bay of Sitka salmon are caught occasionally by trolling and by spearing.

Herring are caught in immense quantities by impaling them on a sharp nail fastened to a long thin strip of wood, and are consumed both fresh and dried, but the larger portion of the catch is converted into oil. The spawn of the herring, which is collected upon spruce boughs placed in shallow water for the purpose, furnishes a favorite article of food in a semiputrid state. The fish most commonly seen on the drying frames at Sitka village at all times of the year are halibut; they are cut in strips, dried partially in the open air, and then suspended in the smoke of the dwelling houses.

At the fishing station of Klawak, on Prince of Wales Island, halibut are caught with the same style of hook, and lines of kelp or bark. The principal bait used here is the cuttlefish, the fishing being done in from 10 to 20 fathoms of water. In fishing for the cannery at this place the Indians average 8 or 10 halibut to a canoe per day, with 2 persons, using not more than 3 or 4 hooks. The amount canned here per annum has not exceeded 200 or 300 cases, of 2 dozen 2-pound cans each.

At Klawak, as well as at Old Sitka, salmon has been canned during the season, but the latter establishment has been abandoned. The Klawak cannery has had in its employ during the season as many as 160 Indians and 20 whites, among the former 30 being women and 5 or 6 boys. The shipments of canned salmon aggregated between 7,000 and 8,000 cases of 4 dozen 1-pound cans each. The once famous rédoute or deep-lake salmon fishery on Baranof Island, which at one time during the Russian rule supplied this whole region, and whence 2,000 barrels of salt salmon were shipped in 1868, now lies idle.

In order to arrive at the quantity of fish consumed by the people of this division it is necessary to take into consideration the fact that fully one-half or more than one-half of the catch is consumed in a dried state, very much reduced in bulk and weight. The waste in the drying process is so great that one person can easily eat at a single meal a fish that weighed 20 or 30 pounds when alive. It is therefore entirely within the bounds of probability that each individual man, woman, or child consumes the equivalent of between 3,000 and 4,000 pounds of fresh fish per year. Among the Innuits of the west the proportion must be much larger, but in the southeastern division game of various kinds is still comparatively abundant. Thus, with a population of 7,000 in round numbers, we may calculate an annual consumption of 24,000,000 pounds of fish; or, striking an average of 5 pounds per fish, between large and small, halibut, salmon, codfish, and herring, nearly 5,000,000 fish of all kinds, in a section the inhabitants of which consume less fish than any other coast people in Alaska.

The eulachan (ulikon), or candle-fish, though consumed by the people of this division, is obtained chiefly in barter from the British possessions, the catch in Alaska being confined to the Stakhin mouth and its immediate vicinity.

2. Prince William Sound.—The people of this section, numbering some 600 in all, inhabiting the coast from Mount St. Elias westward to the east coast of the Kenai Peninsula, though engaged in fishing to some extent at all times of the year, do not depend altogether upon this article of food for subsistence, and consequently the aggregate consumption, or rather destruction, of fish is less than in the southeastern division. Seal meat at all times of the year, and the flesh of mountain goats during the summer, together with that of bears, marmots, porcupines, and sea fowls, are consumed in perhaps equal proportions with fish. A limited number of codfish, halibut, herring, and the various species of salmon comprise the catch of this region, two-thirds of which is probably eaten fresh and the remainder dried, no salt fish being prepared for home consumption or for export. An annual consumption of about 60,000 fish of all kinds (but chiefly salmon), representing an aggregate weight of 300,000 pounds, may be safely estimated for the Prince William Sound section of the coast.

3. Cook Inlet.—The shores of Cook Inlet are inhabited by about 800 natives and a few families of creoles, who are engaged exclusively in fishing during the whole summer season—from May to September and October. During this time the fur-bearing animals are not in good condition, and consequently the whole population, down to the small boys, turn their attention to fishing. In addition to the native fishermen, white men are engaged in salting salmon at two points in the inlet—at the mouth of the Kenai or Kaknu River and that of the Kassilof.[1] The mode of capturing the salmon adopted by the natives for their own purposes is exceedingly primitive and unsatisfactory. The fish being too large to spear with safety a frail staging of poles is erected at right angles with the river bank, extending into the stream. An Indian seats himself at the outward end of this frame, and, holding in the turbid water a large wicker basket with an aperture about 3 or 4 feet in diameter, waits patiently until a salmon enters the basket; but of course this mode of capture is impracticable where the water is clear, and even in the muddiest stream hundreds pass by where one enters.

The king salmon, or chavicha, frequent the streams of the inlet between May 20 and August 20. They are most abundant during the summer neap tide, but in numbers their proportion to the other and less valuable salmon species is as 1 to 3. This disparity in quantity, however, is equalized somewhat by bulk and quality. The maximum length of the chavicha reported since 1870 was 6 feet, and the maximum weight 97 pounds, the average length being about 4 feet and the average weight 50 pounds. They appear regularly on the 20th of May, running in pairs and not in schools, and hugging the shore. They at all times refuse to take the hook, and prey upon the candlefish and stickleback, not, however, consuming very many. They are caught by the whites in weirs and nets, the latter being 12 feet deep by 120 feet in length, with about 8 and 8½ inch mesh. The weirs, consisting of poles and a wickerwork of roots and bark, are erected on the mud flats of the river at low tide.

After the king salmon two other varieties, the silver (kisuch) and the red salmon, make their appearance in immense numbers. The mode of capturing the salmon adopted by the white fishermen is essentially the same on the Kenai and the Kassilof rivers. The number of king salmon captured at the latter place during 1880 was 8,000, weighing 320,000 pounds, while the red and the silver salmon numbered 18,500, of an average weight of 10 pounds each, or 185,000 pounds. At Kenai the number of king salmon secured was 7,500, weighing about 300,000 pounds.

The native population of Cook Inlet comprises 168 families (averaging about four individuals each). Each of these families prepares at least 750 pounds of dried salmon for winter provision, which would give an aggregate amount of 126,000 pounds of dried salmon put up on the inlet, representing over a million pounds of fresh fish. The creole families distributed over the various settlements number 44. These put up about 6 barrels of salt salmon each, or 264 barrels, weighing 52,800 pounds. Of dried fish these creoles put up 400 pounds to each family, or an aggregate of 17,600 pounds, representing 176,000 pounds of fresh fish. Thus we arrive at the astonishing aggregate of 2,760,000 pounds of fish as the annual consumption by natives

[1] Last year a cannery on the Kassilof River put up 6,000 cases of 2 dozen cans each.

and fishermen on Cook Inlet. It must be borne in mind, however, that by far the greater portion of this immense bulk is wasted in the process of drying.

In former times the natives of the lower part of Cook Inlet engaged largely in the capture of beluga, or white grampus, deriving from these monsters the greater part of their subsistence. The belugas seem to be plentiful in the turbid waters of the inlet, and schools of them enter some of the rivers as far as the limits of tide water, but the practice of hunting them seems to be dying out among the present generation, which finds easier modes of procuring subsistence, and the killing of the beluga is now a rare occurrence.

Large schools of the eulachan, or candlefish, frequent the larger rivers of the inlet and are highly prized as food, but their presence in the rivers is exceedingly brief, and the catch can scarcely be considered as an item in the domestic economy of this region.

4. The Kadiak district.—The piscatorial wealth of this district has already been referred to in regard to cod fishery, but at the present time the salmon catch is of greater importance both for home consumption and for export. The consumption of dried salmon within the district by 159 families of creoles and 255 families of natives amounts to 310,500 pounds, representing 3,105,000 pounds of fresh fish. The creole families put up in addition nearly 1,000 barrels of salt salmon, weighing approximately 200,000 pounds. The consumption of fresh salmon, as such, may be estimated at one-half of that of codfish throughout the year.

In addition to this immense catch of salmon for home consumption there are on the Karluk River, emptying into Shelikof Strait, on the west coast of Kadiak Island, two fishing establishments of considerable magnitude; between 1,600 and 1,800 barrels of salted salmon being secured here by the two firms during the season of 1880.[1] Several hundred of these barrels were filled with bellies only, a process that required the killing of 37,500 fish in order to fill 125 barrels. Three hundred thousand pounds of salmon were converted into "yukala" at this station in 1880, yielding 17,500 pounds of dried fish, and it is safe to presume that at the present time three or four times this quantity is salted at Karluk and shipped to San Francisco. The run of salmon in the Karluk River at the height of the season is so great as to interfere seriously with the movement of canoes in crossing the stream, and from 10,000 to 20,000 barrels could be filled here easily during the season. The fishing is done entirely with seines from 20 to 25 fathoms in length, 3 fathoms in depth, with a mesh of 3½ inches. The average weight of the salmon secured at Karluk is 10 pounds. The whole native population is employed in these fisheries during the summer, turning their attention to hunting only during the winter.

Among the creoles of the Kadiak district and the more prosperous of the native families the use of the birdarka or kaiak has been to a great extent superseded by small craft—sloops and plungers—mostly built to order by the skillful carpenters of the creole settlements of Afognak and Yelovoi. A few fishing schooners, ranging from 15 to 20 tons burden, have also been constructed at Kadiak and Wood islands, but these are employed in fishing comparatively a small portion of the time, being chartered by traders during the hunting season.

The salmon of Karluk is perhaps a little inferior in quality to that of Cook Inlet, but, being possessed of flesh of a deep red color, it meets with ready sale.

5. The Belkovsky district.—This district includes the Shumagin islands, which have already been discussed in connection with the codfishery. Throughout this section salmon is caught only for home consumption, for which purpose there seems to be an abundant supply; but with codfish near at hand in the immediate vicinity of every settlement it is not looked upon as being of great importance. The inhabitants of this district are nearly all successful sea-otter hunters, who are able to purchase large quantities of imported provisions, and consequently the consumption of fish is much less than in some other districts. A calculation could not be made upon the same basis here as in the Kadiak or Kenai districts, but the 167 families inhabiting the settlements of Belkovsky Parish consume perhaps from 150,000 to 200,000 pounds of salmon annually, fresh and dried, and an equal quantity of codfish.

[1] Last year one firm shipped from the same place 5,000 cases of canned salmon and 2,100 barrels of 200 pounds each of salt salmon.

6. The Oonalashka or Aleutian district.—The inhabitants of Oonalashka district engage chiefly in the pursuit of the sea-otter, and fishing is limited to the demand for home consumption. The fishes here are nearly the same as those of the Kadiak and the Belkovsky districts, with the exception of the greenfish, or rock-cod, which is plentiful in the deep bays of the Aleutian chain of islands; flatfishes, halibuts, and flounders are very abundant, and are taken in large quantities with spears; the halibut, however, is not as large as that found in other districts of Alaska. As has already been remarked, codfish also frequent the harbors and a few banks in Bering Sea, and the striped fish, yellow fish, or Atkha mackerel exists here in immense numbers. This fish (described by Pallas as *Labrax monopterygius*, but known at present as *Pleurogrammus monopterygius*) is found about the whole of the Aleutian chain and also among the Shumagin islands, congregating in large schools. At Attoo it is known as the kelpfish, on the Shumagins as the yellow or striped fish, and from Oonalashka to Atkha as the Atkha mackerel. The last name appears very appropriate, from the fact that when salted and preserved just as mackerel are treated, it has the same taste as the latter. There can be no doubt that if this striped fish were properly introduced into the markets it would meet with a ready sale, as it is certainly an excellent food-fish either salted or fresh. Traders at Nazan Bay, Atkha Island, report that 500 or 600 barrels could easily be put up by them in that bay alone. The latest price of this salt fish reported from San Francisco was only $10 a barrel, but it is safe to presume that the same fish put up in a marketable shape in kits would command a better price.

Three or four species of trout and many varieties of salmon frequent the bays and larger streams of this district, existing everywhere in sufficient quantity to supply the inhabitants with winter stores of dried fish or yukala. Captain Harbor, on Oonalashka Island, is frequented at certain seasons by immense schools of herrings of a large variety, and exceedingly fat. Occasional shipments in small lots to San Francisco meet with ready sale in that market, especially for pickling.

Here, as in the Belkovsky district, the comparative wealth resulting from the sea-otter trade has caused the natives to neglect their natural food supplies, such as fish and game, and to purchase imported provisions, consequently the consumption of fish is proportionately much smaller than in less favored districts; but at a rough estimate the annual destruction of fresh fish by the inhabitants of the Oonalashka or Aleutian district, numbering some 1,400, may be put down at 700,000 pounds.

7. The Bristol Bay district.—This district comprises the coast of Bering Sea, between Krenitzin Strait and Cape Newenham, with the rivers Oogashik, Igagik, Naknek, Kvichak, Nushegak, Igushek, and Togiak, and their tributaries. The natives of this region, numbering about 4,000, derive a very large proportion of their subsistence from the various kinds of salmon which frequent the rivers in the greatest abundance. Exports from this section have thus far been limited to from 800 to 1,200 barrels of salted salmon per annum from the Nushegak River.

The inhabitants of a few settlements on the north coast of the Aliaska Peninsula and about Bristol Bay engage occasionally in the pursuit of the whale and walrus, gaining thereby a very considerable addition to their food supply, but the consumption of salmon is not thereby perceptibly lessened.

The annual "run" of the salmon family in the rivers of this district begins in the last half of May and continues until the beginning of September. The inferior species of redfish and "gorbusha" are caught until late in October, and even in November, while the various kinds of salmon trout and whitefish exist under the ice of streams and lakes throughout the winter. By the middle of September the banks of lakes and rivers, whose waters begin to fall with the first frosts in the mountains, are covered with rows and heaps of dead silver and king salmon two and three feet in height, representing the number of these fish that died from exhaustion and bruises received in struggling with the fierce current, the rocks, and snags in their annual journey of reproduction. The description of one river at this period may serve as a type for all. In the month of September, 1880, I struck the Igushek River where it springs from a beautiful lake surrounded by mountains of considerable height. The gravelly beach of the lakes and every bar

and shoal of the river was lined with the decayed and putrefying bodies of the fish, which lay in windrows, as it were, from one to two feet deep, while every overhanging bough and projecting rock was festooned with the rotten bodies. At night a space had to be cleared of this disgusting mass to pitch our tent upon, and the abominable stench affected us to such a degree that, though entirely without provisions, we did not feel the pangs of hunger there.

There can be no doubt that here, as well as in the districts already discussed, a more economical method of preserving the fish would permit of the exportation of large quantities, though the salmon caught annually to feed these 4,000 people can not be estimated at less than 2,000,000 pounds.

8. The Kuskokwim district.—We now turn our attention to another district, drained by a great river and somewhat densely inhabited by an almost purely ichthyophagous population. Salmon in three or four varieties throng the channel and sloughs of the Kuskokwim from May to October; trout and whitefish of various kinds are trapped under the ice throughout the winter, while the backwaters of the tundra, the lakes, and ponds are full of pike and a very toothsome and nutritious small blackfish peculiar to this region and the Yukon delta, which has been named, in honor of Mr. William H. Dall, *Dallia pectoralis*. The fish is so abundant that only old men, boys, and women engage in the catch, while the men hunt reindeer and moose and pursue the "maklak" (a large seal) for the sake of its luscious blubber. In the estuary of the Kuskokwim and the wide-mouthed tide creeks of the low delta land the beluga, or white grampus, is still quite plentiful and furnishes ample stores of blubber and oil, a large proportion of which finds its way to the people living above tide water, who can only obtain by purchase the oil in which to dip their dried salmon.

The consumption of salmon in this district, thickly populated as it is within a hundred miles of the coast, is exceedingly great, for here not only human beings but dogs also must be fed. The ratio accepted for the other districts of 5,000 pounds of dried fish for each individual must be increased here by at least one-fifth, representing 6,000 pounds of fresh fish destroyed for the maintenance of one individual and his proportionate share of the family dogs.

Throughout the winter, when snow lies deep through forest and tundra and hunting is made impossible, the native of the valley of the Kuskokwim depends entirely upon the supply of whitefish (*Coregonus*) in the main river and its tributaries, and every village has its traps set over eddies and shoals as soon as the ice is firmly established. The traps are of nearly the same construction as those used in the summer, but of somewhat smaller dimensions, as they are not intended for the reception of the huge king salmon or the full-grown "nalima." Every morning at dawn, or between 8 or 9 o'clock, the men of the village can be seen making their way to the traps, armed with ice picks, curiously fashioned from walrus tusks or reindeer antlers, for each succeeding night a new, solid ice covering forms over the trap, which must be removed to get the fish. Sometimes after an extraordinarily cold night it happens that the whole wicker basket of the trap, including its contents, is frozen solid, an accident involving considerable labor, as the trap must then be taken to pieces and built anew. In spite of all such difficulties the supply of whitefish is generally sufficient for the maintenance of the Kuskokwim people during the winter, with the help of the scanty stores of dried salmon preserved during the summer and the hares and ptarmigans trapped by the boys.

In the lakes, the feeders of all the tributaries of the Kuskokwim, the salmon trout is quite plentiful throughout the winter and is secured by the natives with hooks and lines or dip nets through openings in the ice. Were it not for this unfailing supply of whitefish and trout it would be impossible for these improvident savages to live through the winter. This remark refers only to the inhabitants of the upper river. On the lower river, within the influence of the tremendous tidal action described elsewhere, the river does not sustain a solid covering of ice, and seals are hunted throughout the winter, furnishing ample supplies of lucious oil and blubber; and even the beluga comes up the gulf-like estuary in schools, puffing and snorting like a fleet of tugboats between the masses of ice floating up and down with the changing tide.

The oil obtained from the beluga and the large seal (maklak) is a very important article of trade between the lowland people and those of the mountains, the latter depending upon it

entirely for lighting their semi-subterranean dwellings during the winter and to supplement their scanty stores of food. The oil is manufactured by a very simple process. Huge drift logs are fashioned into troughs, much in the same manner as the Thlinket tribes make their wooden canoes. Into these troughs filled with water the blubber is thrown in lumps of from 2 to 5 pounds in weight; then a large number of smooth cobblestones are thrown into a fire until they are thoroughly heated, when they are picked up with sticks fashioned for the purpose and deposited in the water, which boils up at once. After a few minutes these stones must be removed and replaced by fresh ones, this laborious process being continued until the oil has been boiled out of the blubber and floats on the surface, when it is removed with flat pieces of bone or roughly fashioned ladles and decanted into bladders or whole seal skins.

The densely populated delta between the mouths of the Kuskokwim and Yukon rivers, with its great network of channels, sloughs, rivers, and lakes, offers to its inhabitants scarcely any article of food but such as is drawn from the water, the beluga and the seal furnishing the meat and oil so necessary to sustain life in high latitudes, while the salmon and whitefish abound here as they do on the larger rivers; and in addition to these is found the small blackfish named *Dallia pectoralis*. This fish, not exceeding 5 or 6 inches in length, and scarcely known to the scientific world until a few years ago, is of the greatest importance to the inhabitants of this delta. It is found in all the shallower channels and lagoons throughout the country in such quantities as to furnish subsistence for whole settlements in the most desolate regions, where nothing else could be found to sustain life at certain seasons of the year. The blackfish, as it is called by the natives, is exceedingly fat, and a good quality of pellucid oil is obtained from it by the process described above. Its presence is of the greatest advantage to the civilized traveler who may happen to traverse this almost unknown region, as it represents the only palatable article of food to be found there during the winter; and without it he would be obliged to subsist upon dried fish, blubber, and oil in various stages of decomposition. The people inhabiting the region where the blackfish is found are in a better condition physically when spring approaches than any of their neighbors in regions where it does not exist, being almost exempt from the annual period of starvation elsewhere preceding the beginning of the salmon run in the rivers. The 3,000 or 4,000 people inhabiting the delta must be looked upon as fish eaters only, and the consumption of fish by them in the course of the year must be correspondingly great.

9. The Yukon River district.—It is next to impossible to form an adequate estimate of the consumption of fish on a river of the magnitude of the Yukon from the point where it enters Alaska on the British Columbian boundary until it reaches Bering Sea. We know that the run of the various species of salmon is very large, though not extended over a long period, and also that a large proportion of the catch is preserved by the wasteful process of drying only, which reduces a fish weighing as it comes out of the water from 60 to 100 pounds to a flat and shriveled object of 5 to 10 pounds. The loss on all classes of fish is in a like proportion, and consequently the quantity required for the sustenance of a single individual throughout the seven or eight months of winter must be very great.

As far as the Eskimo race has extended its settlements on the banks of the river, to a distance of from 200 to 300 miles from the sea, the fish traps already described lie on both banks; but as this mode of fishing affects only such fish as ascend the stream along the banks and eddies, the number of salmon which complete their journey of reproduction without meeting any obstacles must exceed by far the number secured by the natives. In view of the immense width and depth of the river it seems very doubtful whether any of this immense mass of fish could be secured by fishermen, even were they provided with all the appliances now in use on the Columbia River in Oregon and the Sacramento in California.

The Athabaskan tribes inhabiting the Upper Yukon region do not, as a rule, make use of traps. The game is still plentiful in their country, and they resort to fishing only with hooks and lines, chiefly in the smaller streams and lakes. For the purpose of securing a small stock of fish for traveling stores and dog feed, whole families descend the river in the summer and camp at some favorable spot for a month or two, while others obtain the same supplies in exchange for furs from the natives of the lower river. In addition to man and his dogs we find here another

factor in the consumption of fish in the bear (*Ursus Richardsonii*), who is an expert fisher, and consumes immense quantities both of salmon and whitefish. He is accustomed to select a projecting point on the sloping bank of a river, where he stretches himself close to the water's edge and watches the surface of the turbid stream. The ripple caused by the passage of a large fish informs him of the proper time to make a sweep with his huge paw, the claws projecting like so many hooks, and he seldom fails to bring forth one or more fish at a time. These he carries away to some distance from the river bank, where he lies down and strips the bones of all the flesh as neatly as if he intended to preserve the complete skeleton as a specimen. The bones of salmon and whitefish are frequently found at a distance of a mile or two from the streams, where the fish have been carried by bears to feed their young. These animals are plentiful throughout the Yukon region, and subsist upon no other food from the time the salmon begins to run until the berries are ripe, late in August, when the shaggy fish eaters become strict vegetarians.

For the Yukon River district the annual destruction of fish for the maintenance of each individual can not be calculated at less than 6,000 pounds.

10. The Arctic district.—Of the consumption of fish along the Arctic coast of Alaska to the northward of Bering Strait no reliable data are accessible. The people subsist to a greater extent upon seals, walruses, and the meat of whales. The run of salmon in the few larger rivers watering this region is necessarily short, and the fish is much smaller than we find it to the southward; the natives, however, manage to put up during the brief summer a small supply of dried salmon and whitefish. "Fakhnia," a species of tomcod, is caught during the summer along the lower Arctic coast, and salmon trout ascends the larger streams. Codfish have been caught at a few points along the Arctic coast, but no banks have been located. Of late years, since whaling has been pursued more actively by means of steam vessels and improved appliances, the Eskimo living upon the coast have lived so largely upon the offal left to them by whalers after cutting up the huge cetaceans that they have been enabled to neglect fishing to a great extent; but unfortunately these same whalers, who temporarily increased one source of subsistence, destroyed by thousands an animal furnishing the staple food of these regions—the walrus—which is rapidly being exterminated for the sake of its ivory. The animals are shot with rifles from ships and boats, and out of ten animals killed but two or three are secured, while seven or eight sink and are lost. This wasteful practice is a question of life or death with the poor Eskimo. At points most exposed to such depredations, like St. Lawrence Island, in Bering Sea, two-thirds of the people have already perished by starvation. The evil is increased by the effects of spirituous liquors freely distributed among these natives by whalers and illicit traders, causing the latter to neglect, during periods of wild intoxication, the laying up of stores for winter.

The whaling industry of the North Pacific is now carried on chiefly on the American side of the Arctic, beyond Bering Strait, with the exception of some coast whaling on the California coast and in the channels and passages of Alexander Archipelago. The vessels engaged in the business on the Alaskan coast in 1880 were 36 sailing craft and 4 steamers. Their catch consisted of 35,000 pounds of whalebone, 15,000 pounds of ivory, and 21,000 barrels of oil. The value of the bone alone was $850,000; that of the oil $280,000; while the ivory brought $9,000, making a total of $1,139,000, or an average of $28,475 per vessel—certainly a remarkable showing of the profits accruing from this industry. The 15,000 pounds of ivory represent at least 3,000 walruses, the average weight of a pair of tusks being 5 pounds. The 3,000 walruses whose tusks were secured would indicate that at least 10,000 were killed, seven-tenths of which were lost. In view of such wanton destruction it is easy to foresee the extermination at no distant date of the people who depend upon the walrus for subsistence.

The common hair seal and the sea lion have decreased in numbers to such an extent along the whole coast line of Alaska that their pursuit no longer occupies a place among the industries of the country, and they supply a wholly local demand. The sea lion has almost disappeared from the vicinity of the sea otter hunting grounds, compelling the trading firms to import such skins from the coast of Lower California and Mexico, in order to furnish their hunters with the material for making their canoes. Sea lion meat was once a staple article of food with the

Aleutian people and among all the Eskimo tribes, but at present it is looked upon as a delicacy not easily obtained.

The supply of fish of various kinds in Alaska is practically inexhaustible, but the stores lavished upon the natives of that country by bountiful nature could not be more wastefully used than they are now. Any development in the fishing industry must necessarily be an improvement, causing a saving in the supply.

The proportion of Alaskan fish brought into the markets of the civilized world, when compared with the consumption of the same articles by the natives, is so very small that it barely deserves the name of an industry of the country. The business, however, shows a decided tendency to increase in magnitude, and within the last few years the shipments of salted salmon in barrels from the Kadiak-Aleutian divisions have been steadily increasing, until they now amount to between 4,000 and 5,000 barrels per annum. These sell readily at $9 per barrel in San Francisco, leaving a handsome profit to the men who have invested capital in the enterprise. The number of cases of canned salmon shipped during the last year was between 8,000 and 9,000, each case containing two dozen 2-pound cans. Codfish shipments from the Shumagin Islands and Bering Sea amount to nearly 600,000 fish, of the average weight, when cured, of from 3 to 5 pounds each, bringing from 6 to 7 cents per pound. But few men, with a small amount of capital, are engaged in this industry in Alaska in the present unsettled condition of the country.

THE TIMBER OF ALASKA.

The claims of Alaska to the possession of vast tracts of valuable timber have been both exaggerated and disputed.

At the beginning of this chapter we sketched the distribution of forests throughout the whole country. In detail, we find that the timber of Alaska consists of evergreen trees principally, the spruce family preponderating to an overwhelming extent. These trees grow to their greatest size in the Sitka or Alexander Archipelago. An interval occurs from Cross Sound until we pass over the fair-weather ground at the foot of Mount St. Elias, upon the region of Prince William Sound and Cook Inlet, where this timber again occurs, and attains very respectable proportions in many sections of the district, notably at Wood Island and portions of Afognak, and at the head of the Kenai Peninsula and the two gulfs that environ it. The abundance of this timber and the extensive area clothed by it are readily appreciated by looking at the map, and are rendered still more impressive when we call attention to the fact that the timber extends in good size as far north as the Yukon Valley, clothing all the hills within that extensive region and to the north of Cook Inlet and Kenai Peninsula, so that the amount of timber found herein is great in the aggregate. The size of this spruce timber at its base will be typified in trees on Prince of Wales Island 50 feet and over in height, with a diameter of at least 3 feet. They have not grown as fast as they would have grown in a more congenial latitude to the south, such as Puget Sound or Oregon; hence, when they are run through the sawmill the frequent and close proximity of knots mar the quality and depress the sale of the lumber. Spruce boards are not adapted to nice finishing work in building or in cabinet ware, or, indeed, in anything that requires a finish and upon which paint and varnish may be permanently applied, for under the influence of slight degrees of heat it sweats, exuding minute globules of gum or resin, which are sticky and difficult to remove.

The other timber trees in southeastern Alaska, Kadiak, and Cook Inlet may be called exceptional. But one very valuable species of yellow cedar (*Cupressus nutkanensis*) is found scattered here and there within the Alexander Archipelago and on the 30-mile strip. Here this really valuable tree is found at wide intervals in small clumps, principally along shoal water courses and fiords, attaining a much greater size than the spruce, as frequently trees are found 100 feet high, with a diameter of 5 and 6 feet. The lumber made from these is exceedingly valuable, of the very finest texture, odor, and endurance, and is highly prized by the cabinet-maker and the shipbuilder.

While, therefore, we find a very large supply of timber in Alaska, such as we have described, yet it is instantly apparent that as long as the immense forests of Oregon, Washington and southern British Columbia stand as they exist to-day there will be practically no market for Alaskan lumber.

The accompanying map indicates, as far as it has been ascertained, the distribution of the yellow cedar (*Cupressus nutkanensis*) and the Sitka spruce (*Abies sitkensis*), and also the northern and western limits of the latter tree. The white birch is found throughout the region which supports the spruce—scattered or in small bodies—chiefly along the water courses. The alder and willow are found on all the lowlands, reaching far beyond the northern and western limit of the spruce. A poplar, resembling our cottonwood, attaining great size under favorable circumstances, is also found in nearly all the timbered sections of Alaska south of the Arctic Circle.

To the westward of the one hundred and forty-first meridian no timber grows at an altitude higher than 1,000 feet above the level of the sea, and consequently the forests are confined entirely to valleys and plains, all mountains being bare throughout the section indicated. On Kadiak Island and on the Aliaska Peninsula the change from a vigorous growth of spruce timber to bare hills and grassy plains is very abrupt, and is apparently unexplained by any corresponding change in soil, temperature, or general climatic conditions. A slightly curved line, beginning at the intersection of the coast hills of the east shore of Norton Sound with the Oonalakleet River, passing across the Yukon and the Kuskokwim rivers, the mouth of the Nushegak, across the Aliaska Peninsula, and impinging upon the North Pacific in the vicinity of Orlova Bay, on Kadiak Island, will serve as the western limit of spruce forest in Alaska.

With reference to quality the Alaska forest trees may be divided as follows:

1. Yellow cedar (*Cupressus nutkanensis*).—This is one of the most valuable woods on the Pacific coast, combining a fine, close texture with great hardness, durability, and a peculiar but pleasant odor. The Russians named it "dushnik" (scented wood) on account of the last-named quality. In the immediate vicinity of Sitka, on Baranof, and adjoining islands, this tree was nearly exterminated by the Russians, but on the Kehk Archipelago (Koo Island) and on Prince of Wales Island and a few others of the Alexander Archipelago, near the British Columbian frontier, considerable bodies of it can still be found, and beyond the line, in the Nass and Skeena River valleys, it is also abundant.

2. Sitka spruce (*Abies sitkensis*).—This is the universal forest tree of Alaska, and is found of gigantic size on the islands of the Alexander Archipelago and on the shores of Prince William Sound. Its medium growth it appears to attain in the valleys of the Yukon and the Kuskokwim, while on the east side of Cook Inlet and on the more northern uplands it is quite stunted and dwarfed. The Sitka spruce is most closely connected with the various requirements of all Alaskan natives in their domestic economy, as its timber is used in the construction of nearly every dwelling throughout the country, and even those tribes who inhabit barren coasts far removed from the limits of coniferous trees, are supplied with it through means of freshets and ocean currents. The sappy outer portion of the wood furnishes splinters and torches that light up during the long months of winter the dark dwellings of interior tribes of Tinneh stock, who know not the oil lamp of their Innuit neighbors. The same material is also used for sledge runners on loose but crisp frozen snow, over which iron or steel would drag with difficulty, as over deep, coarse sand. The Thlinket and the Hyda fashion their buoyant and graceful canoes, both large and small, from spruce logs, and split from them also the huge planks used in the construction of their houses. The lumber manufactured from the Sitka spruce is much less durable than the yellow cedar, very knotty, and consequently not adapted for shipbuilding.

3. Hemlock (*Abies mertensiana*).—Though this tree generally exceeds the spruce in size, it is of rare occurrence, much less valuable as timber, but well adapted for fuel.

4. Balsam fir (*Abies canadensis*).—This tree is found only in small, scattered bodies, and is of little value as timber, but the natives use its bark for tanning and for other purposes.

5. Scrub pine (*Pinus contorta*).—The scrub pine is found throughout the interior of Alaska in small, scattered bodies up to the highest latitudes, but it is of no value as timber.

Thus it will be seen that the forests of Alaska are altogether coniferous, as the small bodies

of birch and the alder and willow thickets on the lower Yukon and Kuskokwim rivers can scarcely be considered to come under this head. Aside from the yellow cedar, which is rare, the timber wealth of Alaska consists of the Sitka spruce, which is not only abundant and large (trees of from 3 to 4 feet in diameter being quite common in southeastern Alaska and Prince William Sound), but also generally accessible.

To give even an approximate estimate of the area of timbered lands in Alaska is at present impossible, in view of our incomplete knowledge of the extent of mountain ranges, which, though falling within the timber limits, must be deducted from the superficial area of forest-covering.

A few small sawmills of exceedingly limited capacity have been erected at various points in southeastern Alaska, to supply the local demand of trading posts and mining camps, but finished building lumber is still largely imported even into this heavily timbered region. In all western Alaska but one small sawmill is known to exist, which is on Wood Island, St. Paul Harbor, Kadiak. This mill was first set up to supply sawdust for packing ice, but since the collapse of that industry its operations have been spasmodic and not worth mentioning. Lumber from Puget Sound and British Columbian mills is shipped to nearly all ports in western Alaska for the use of whites and half-breeds, while the natives in their more remote settlements obtain planks and boards by the very laborious process of splitting logs with iron or ivory wedges. On the treeless isles of the Shumagin and Aleutian groups, as well as in the southern settlements of the Aliaska Peninsula, even firewood is imported from more favored sections of the Territory and commands high prices.

The driftwood washed upon the shores of Bering Sea and the Arctic is of very little value as building material and can not be worked into lumber.

On the map I have also endeavored to show approximately the extent of the tundra, or marshy plains, producing a vigorous growth of mosses, grasses, and even flowers, but resting upon a substratum of frozen soil and ice which does not thaw during the brief summers. The glaciers also have been indicated where they are definitely known to exist, but others could doubtless be found in mountain regions not yet visited.

MINERALS.

Coal is found, chiefly or wholly of a lignite composition, at a great many points throughout the southern and western coasts of Alaska and the islands thereof; and during the past season a vein was opened in the Arctic, above Cape Lisburne, by Captain Hooper, of the revenue marine, who says that he mined it easily and used it with great satisfaction in making steam for his vessel. The oldest coal mine in the country is that on Cook Inlet, near its mouth, at a place still called on the map Coal Harbor. The Russians also took notice of coal at Ounga, on the Shumagin Islands, and several openings were made by them of veins here and there in the Alexander Archipelago. Following the Russians our people discovered and attempted to work one or two in the Sitkan Archipelago and several to the westward. The quality of all this coal located and worked for a brief experimental period was of so poor a grade that in no case has it been pronounced fit for use on steam-going vessels, being so highly charged with sulphur and other deleterious combinations. The value, however, of Captain Hooper's vein in the Arctic to the opening enterprise of steam-whaling, and for the use of the revenue marine itself, must be of very striking moment. These experiments with Alaskan coal have been exceedingly thorough and patiently wrought out at Ounga, where the most laudable, persistent, and even desperate determination has been manifested by the owners of certain ledges thereon to develop their holdings into mines of wealth. The steamers in the territory bring their own coal with them, or have it sent up by tender from British Columbia Sound or California. The traders at the different posts where timber is scarce or entirely wanting use it now as their principal fuel, and it is the sole fuel on the seal islands.

In regard to the reputed findings of large-paying gold mines and other precious minerals I can only say that, as far as is known, there is nothing of the kind in western Alaska; at least

there is nothing located and worked as such, though the prospecting or searching is as active as it has been since the transfer. The surface of the country in southern Alaska being so mountainous and concealed by the timber cloak everywhere covering it, it is of course a slow and exceedingly difficult undertaking to penetrate any distance back, up, and among the mountain valleys in search of mineral. The color of gold can be washed out of the sands of every little stream emptying into the ocean on the northwest coast, and in many places it can be found by searching in the surf-beaten beaches of the seacoast itself. But the question immediately arises with the miner, "Will it pay?" and by that he means, "Will it yield me from $4 to $10 a day if I work it?" Less return for his labor does not satisfy him, nor will it bring others to the places.

The gold-bearing belt of the Rocky Mountain Divide, so familiar to us as it crops out all through our States and Territories, reaches undoubtedly to the Arctic Sea itself. But it must be borne in mind that with every degree of northern latitude as we ascend we cut off working days, as the icy grasp of frost checks the flow of water and shuts down the mills, so that when this gold-bearing belt crosses into our Alaskan boundary far back, and concealed from the sea by the towering summits of the coast range, we find it practically barred out from our miners unless they shall find the free gold and a rich quartz in unwonted abundance.

The quartz mines in the immediate vicinity of Sitka have been abandoned as worthless under present conditions, the output officially reported for the year ending June 30, 1880, being but a trifle over $6,000, with an expenditure of nearly four times that sum. Since 1880, however, much surface gold has been found in the mountains on Gastineaux Channel, between Douglas Island and the mainland, chiefly from the decomposed croppings of ledges. These discoveries have attracted several thousand miners and their followers, and a thriving town, now named Juneau City, has sprung up, claiming very bright prospects in spite of the long interval of enforced idleness between December and April. The never-satisfied prospector has already left these diggings behind and pushed on from the head of Lynn Canal across the divide separating the headwaters of the Yukon from the north Pacific; but whatever discoveries have been made there are located in British Columbia, and consequently without the pale of this report.

The Cassiar diggings, which have during the last five or six years given quite an impetus to Alaskan travel by Fort Wrangell and Sitka, are situated in the territory or dominion of British Columbia, far up the Stakhin River, and away from our limits. They have been failing lately, and the last season's work has been one of sore disappointment and discouragement to the few miners who still hold on.

In Norton Sound, within the deep landlocked shoals of Golovin Bay, there are reputed to be leads of silver ore and graphite. Cinnabar has also been discovered on the Kuskokwim, and assays made of the ore in San Francisco indicate a very valuable discovery there. Other than these minute circumstances we have no better evidence of the mineral wealth of Alaska to offer at this writing, unless we refer to the old legend and partial corroboration of it in regard to the presence of an extensive deposit of copper *in situ* on the banks of the Atnah or Copper River. There is also a mine opened, but just at present not worked, on Prince of Wales Island. This little mine, however, we might say is owned by British Columbians, who say that they are barred out from their legitimate home market on account of the Dominion tariff; hence they are idle.

In connection with the discussion of the mineral resources of Alaska I insert here a translation of the report rendered by Lieutenant Doroshin, who was instructed by the Russian-American Company with an examination of the gold-bearing deposits on the Kenai Peninsula. Doroshin has frequently been accused of suppressing the results of his explorations in order to please the Russian-American Company, but from his report and private letters on the same subject it would seem that such was not the case. He wrote as follows:

> In the year 1850 I was ordered to the Gulf of Kenai (Cook Inlet) in order to investigate the indications of gold first discovered by me in 1848, during my first visit to that neighborhood. I left Sitka on the 1st of May and returned on the 4th of October. During this period the laborers under my command were at work only 49 days, the remainder of the time being spent in excursions to Nuchek, and Ochek Islands, and Voskressensky Bay, and also in the laborious ascent of the River Ka-ktnu, and the tedious transportation of provisions and implements on the backs of men.

In 1851 I left Sitka on the 8th of May and returned on the 30th of October, calling at Nuchek and St. Paul Harbor (Kadiak Island). The working days during this summer numbered 66, much time being wasted in the transportation of provisions and tools. The working force during this season was the same as the last—12 men.

Under these circumstances my prospecting was confined to (1) the valley of the creek Tuslitnu, emptying into the lake Kastudilin, the head of the river Ka-ktnu; (2) the valley of the creek Taslikh-ktnu, with its tributary ravines, and (3) the valley of the creek Chunu-ktnu, with several lateral ravines. The streams Taslikh-ktnu and Chunu-ktnu empty into the Skiliankh River, connecting the lakes Skiliamna and Kastudilin.

Nearly everywhere in these localities gold was found, but nowhere in a larger quantity than $\frac{1}{2\,1\,5\,0\,0\,0\,0}$ of the dirt, or 16 grains of gold to 1 pood (36 pounds) of dirt.

Though the results of my two years' exploration of the Kenai Mountains were thus insignificant, they may be the foundation for more extensive search of the gold-bearing strata. Aside from the valley of the Tsulitnu, where I could not complete my investigations on account of a forest fire, only two other valleys, with their tributary ravines, were examined, and consequently only a small surface of the mountainous Kenai Peninsula has been touched, while nothing has been done in the main mountain ranges of which the Kenai chain is only a branch.

In the following year (1852) Doroshin wrote to Prof. G. A. Gosse:

The small result of my labors has cooled the ardor of the chief manager of the colonies for gold seeking. I do not cease to hope, however, that later some other engineer will be more fortunate in the path pointed out by me, with better means than were at my disposal; in that case, of course, nobody will think of him who first found gold where there were no ancient diggings—where no grains of gold were found in the crop of a grouse [referring to an incident of gold discovery in Siberia], and where the natives have not even a name for the precious metal.

In November, 1855, Doroshin wrote to General Helmerson, member of the Imperial Academy:

Last summer I have passed among the mountains of the Kenai Peninsula, where I had discovered traces of gold as early as 1848. In that year I became convinced that the alluvial sands of the site of the Rédoute St. Nicholas are auriferous. When we find gold in such localities there must be deposits of auriferous ores or sands somewhere. This reasoning and the peculiar combination of clay and diorite on the upper Ka-ktnu induced me to explore its headwaters. We found gold at the outset, and as we advanced up the valley it became evident that coarser particles of gold took the place of the at first barely visible scales.

AGRICULTURE.

I now pass to the agricultural and pastoral resources of Alaska. So much has been said upon this topic, of frantic declamation on one hand and indignant remonstrance on the other, that I shall be very cautious in my presentation of what I know to be facts.

In the first place, let me preface my remarks with the statement that the cereal crops can not be grown in Alaska. This has been settled by numberless patient and repeated tests in the most favored localities. Also, that the fruit trees and the small fruits of our gardens here, as we grow them and recognize them (unless it be the strawberry and the cranberry), can not be cultivated successfully up there. But these people do have in Alaska quite an abundance of indigenous, hardy shrub fruits, such as I have specified elsewhere. The statement made by certain high authority that wild apples are indigenous and perfect their fruit at Sitka is a mere figure of speech, but the other half of the assertion, that wild roses grow there, is true; and for that matter the wild rose blossoms with a rosy flush and the suggestion of perennial flowering up the Yukon, while the violets, the gaily colored pea, and indeed nearly 200 species of lovely blossoming annuals and perennials are found everywhere on prairie and forest land, on the bare hills of the Aleutian Islands, and covering the great moor and tundra of Alaska.

But taking up the subject of the vegetable garden, it is found that there are localities in Alaska where for the last eighty years or even more up to the present date good potatoes have been raised, though I should say perhaps that the raising of these tubers is not a certain success year after year except at one or two points within the Alexander Archipelago, namely, at the mouth of the Stakhin River, at Fort Wrangell, and on Prince of Wales Island. The potato grounds of Alaska, however, can with due care and diligence be made to furnish, in the Alexander Archipelago, in Cook Inlet, at Kadiak Island and islets contiguous, and at Bristol Bay, a positive source of food supply to the inhabitants. It is not generally known that on Afognak Island there are nearly 100 acres of land dug up in patches here and there which are planted by the inhabitants, and from which they gather an annual harvest of potatoes and turnips; but there are no fields spread out, squared up, and plowed anywhere in Alaska. The little openings in the

forest or the cleared sides of a gently sloping declivity in sheltered situations are taken up by the people, who turn out with rude spades of their own manufacture, principally, for the purpose of subjugating and overturning the sod. Many of the gardens, noticeably those at the Kadiak village, are close by the settlement, while others are at some distance.

The potato crop at Kadiak in 1880 was a total failure; and this happens at intervals of from four to six years. The winter preceding the planting in 1880 was an unusually cold and protracted one, and the season, short at the best, was cut off by unwonted early frosts during September and the latter part of August. The usual growing season, however, opens early in June, from the 1st to the 10th; and the potatoes are planted in May, coming up and growing freely until October, when they are harvested. The growth of potatoes, fairly established and well defined, presents the only firm and tangible evidence of agricultural capacity within the limits of Alaska. The turnip grows and flourishes wherever the potato succeeds.

On Wood Island, Kadiak Harbor, during a number of years past, horses have been kept to perform certain labor in connection with a mysterious ice company, and for the use of these horses a field of 12 acres of oats is regularly sown; growing up, frequently heading out, but never ripening. This, however, is a secondary object with the planters, who cut the green crop for haying purposes.

There have been repeated attempts to raise stock cattle, sheep, and hogs in large herds within the borders of Alaska. The subject is one in which the Russians first naturally took a deep interest, for they were fond of good living, and were as desirous as any people could be to have the best of beef or mutton, and the sweetest pork on their tables. They brought over hardy selections from the Siberian stock, placing the cattle at almost every point of importance for trial. The result, after years of patient and persistent attention, was that the herds on Kadiak Island throve the best and became of real service in assisting to maintain the settlement. Here there is a very fine ranging ground for pasture, and in the summer there is the greatest abundance of nutritious grasses, but when the storms of October, freighted with snow, accompanied by cold and piercing gales, arrive and hold their own until the following May, the sleek, fat herd of September becomes very much worn and emaciated in June. It has given its owner an undue amount of trouble to shelter and feed. Hay, however, suitable for cattle, or at least to keep cattle alive, can be cut in almost any quantities desired for that purpose, but the stress of weather alone, even with abundance of this feed, depresses as it were and enfeebles the vitality of the stock so that the herds on Kadiak Island have never increased to anything approximating a stock grower's drove, rarely exceeding 15 or 20 head at the most. Notable examples of small flocks of sheep which have been brought up since the transfer and turned out at Oonalashka, Ounga, and elsewhere have done well. The mutton of the Alaskan sheep when it is rolling in its own fat, as it were, is pronounced by epicures to be very fine. But the severe winters, which are not so cold as protracted, when the weather is so violent that the animals have to huddle for weeks in some dark low shelter, cause a sweating or heating of their wool, which is detached and falls off, greatly enfeebling and emaciating them by spring. The practice of the traders at some places now is to bring beef cattle up in the spring from San Francisco, turn them out into the grazing grounds on the Aleutian Islands, Kadiak, and even to the north, where they speedily round out and flesh up into the very finest beeves by the middle or end of October, when they are slaughtered. Some ludicrous instances occur in this connection when Texas cattle are disembarked in these unwonted nooks, where they charge from the gangway of the vessel up through the native settlements as though possessed of an evil spirit, while the natives dive into their barabaras with remarkable celerity and activity, peeping thence at intervals in anticipation of some fearful crisis. The animals at once repair to the solitudes of the mountain recesses of the interior, away from the settlements, where they remain undisturbed until they are hunted and shot by the traders.

The Russians familiarized some of these natives with horses as well as cattle, but a great sensation remained in store for these people after the transfer of the Territory, when mules were taken up there by the soldiers under the mistaken notion that they were going to be used in going about and over the country. These animals were a source of profound astonishment

to the natives, and the mules manifested toward them an exceedingly vindictive and aggressive disposition, always charging, with ears laid back, and threatened uprising of the heels, upon the luckless savages chancing to cross their feeding grounds, the warriors turning in swift, tumultuous flight from the advance of the unknown quadrupeds when they would have faced any number of bears without moving a muscle of their countenances.

Mules and horses, however, have no economic value here, there being no service for them on land. A little work is done with profit on the seal islands by mule teams, and these, perhaps, are the only draft or saddle animals that serve any useful purpose in the Territory, with the exception of those at Wood Island, before mentioned.

With regard to the raising of hogs, the propensity of these creatures to devour carrion on the sea beach bars them of much interest, and they are not encouraged anywhere. The same difficulties as specified above, however, occur in feeding and caring for them during the winter.

I feel fully warranted in saying that the extended coast islands and mainland of Alaska will not support any considerable number of our people as agriculturists, but it is also equally apparent that the existence of those who are living and who will always live in the Territory can be softened in many of its asperities by better attention to the development of the resources which are latent in the soil at many favored localities, notably at Bristol Bay, Kadiak, Cook Inlet, and the Sitkan Archipelago. There is a singular indifference, with a growing disinclination of the people themselves, to labor in this direction. In the times of the old Russian rule there were regular orders and regular squads of soldiery assigned to this purpose every year, and the old retired and patient colonial citizens were obliged by the terms of their indenture with the company to devote themselves wholly to agriculture. Now, of course, they are free to choose between the profits of hunting and the smaller gains of farming, and they naturally drop the latter and rally to the former. It will thus be seen that the subject of agricultural resources in Alaska is not a new agitation, and the result of American thought and industry, and it will be found that those points located by the Russians 80 years ago as most suitable for their potatoes and other garden relishes, such as radishes and turnips, are the best to-day.

BUSINESS STATISTICS.

Owing to peculiar local circumstances, and the nature of the traffic carried on in Alaska to obtain furs and fish, it is exceedingly difficult to arrive at an even approximately correct estimate of the volume of importations of provisions and dry goods. As an example of this I may cite the discrepancy existing between the sums obtained from the custom-house of San Francisco and those furnished by firms engaged in business in the country. At the San Francisco custom-house the books indicate shipments of provisions to Alaska from that port in the following quantities: Flour, 801,508 pounds, or not much over 3,000 barrels; hard bread, 3,403 cases; tea, 823 chests of 52 pounds each; sugar, 782 barrels and 2,463 half-barrels; and for the same period the books of two San Francisco firms trading in Alaska show shipments of over 5,000 barrels of flour and other provisions in proportion. At some points the consumption of imported-provisions, such as flour, hard bread, tea, and sugar, is extraordinarily large, and this is especially the case in regions inhabited by the prosperous sea-otter hunters and on the Pribylof Islands, where the native sealers have large incomes, and the consumption of flour amounts to a barrel per annum for each man, woman, and child, more than the average in civilized communities. It is reported by traders that the demand for flour and hard bread increases annually, even among the savage tribes of the interior. The demand for tea, also, is steadily gaining, and the consumption of sugar is universal wherever it can be carried by the traders, but is especially large in those sections of Alaska—especially in the southeastern division—where the creoles and natives understand the manufacture of alcohol from sugar and molasses. Including the southeastern division, which is supplied chiefly from Portland, Oreg., and British Columbia, the annual shipment of flour to Alaska may be estimated at not less than 10,000 barrels, or a barrel for every three individuals of its population. If to this are added 5,000 or 6,000 cases of hard bread, 1,200 chests of tea, and 2,500 barrels of sugar, it is seen that the trade with Alaska in these

staples alone is assuming considerable proportions. The shipments of tobacco aggregated from 15,000 to 20,000 pounds. Of the value of the dry goods it is impossible to make an estimate, but it is safe to assume that it does not equal that of groceries or provisions.

From the above it would appear that Alaska, with its savage population of over 30,000, represents a larger volume of trade than any other portion of the United States inhabited by uncivilized tribes, even without reference to such mineral wealth as has been or may yet be developed within its limits, or to the net revenue derived by the Government above all its expenditure for Alaska from the lease of the fur-seal reservation on the Pribylof Islands.

The statistics relating to Alaska contained in the reports on commerce and navigation furnished by the Treasury Department are of a very unsatisfactory character, as a few extracts from these documents will serve to demonstrate. During the last year of Russian rule in Alaska we find the imports from Russian America to the United States for the year ending June 30, 1866, valued at $39,544, while the exports to Russian America were $104,315, of which $81,609 covered domestic produce. In the year ending June 30, 1868, the first year of American occupation, the total shipments to Alaska were valued at $56,067. This represents the period covering the first rush of business men into the newly acquired country. During the years following this period both imports and exports apparently increased in volume, reaching the figures of $180,000 and $200,000 in value; but looking at the itemized list of shipments it is easily discovered that this trade is in transit from British Columbia, through the American port of Wrangell, to the Cassiar mines in British Columbia, the items showing large shipments of grain, mules, cattle, flour, hard bread, and groceries among the exports of Alaska, articles which should, of course, have been placed under the head of transit trade. All these successive reports evidently refer only to the shipments to and from Alaska through the nearest custom-houses of Port Townsend, Wash., and Portland, Oreg. the vast trade of San Francisco with all western Alaska not being considered at all. The statistics of immigration contained in the same Treasury Reports may mislead, as they simply record the transit of miners and traders through Alaska from one point in British Columbia to mining camps in another section of that country. By far the largest portion of Alaska is removed from all communication with Sitka.

The shipping statistics derived from the same reports represent chiefly the shipping of the southeastern division. One reason for this state of affairs lies in the fact that the returns from the western ports of entry at Kadiak and Unalaska can be forwarded to the collector at Sitka only by the sailing vessels of fishermen and traders via San Francisco, and it often happens that these documents are delayed for months and even years.

As an instance of the deficiency of the shipping statistics I may mention that while the report of 1880 gives the number of sailing vessels registered as seven, aggregating 133 tons, in the same year there were registered at the port of Kadiak alone eleven sailing vessels, aggregating 175 tons in capacity.

Geography and Topography.

THE MAP OF ALASKA.

The fact that the new map of Alaska published with this report differs essentially in many of its features from all the maps which have previously been published necessitates a few words explanatory of the methods adopted in compiling, of the reasons for the selection of authorities, and for changing the outlines of certain portions of the coast.

The southeastern section of Alaska, from the southern boundary to Cape Spencer, comprising the islands of the Alexander Archipelago, has been represented in accordance with the survey under the auspices of the British admiralty, corrected to date by Commanders Beardslee and Glass, United States Navy, and Assistant William H. Dall, United States Coast Survey. In the topography of the section of the mainland forming the watershed between the Chilkat and Yukon rivers, or rather between the Pacific and Bering Sea drainage systems, the late discoveries of the explorer Krause, of the Bremen Geographical Society, have been inserted, and the route to the eastern and western Kussoa Lakes (the real heads of the Yukon) has been indicated.

The changes in Lynn Canal, or Chilkat Inlet, and to the north of Cross Sound are quite remarkable. The waters of Glacier Bay extend far to the northward, where heretofore a compact peninsula appeared on the maps and charts, while the positions of Sitka and a few other important points have also been corrected.

The intricate character of the deep-sea channels which form a network throughout this section leads us to the conclusion that future actual and connected surveys will probably result in essential changes of outline and in the location of hundreds of islands as yet not indicated on the map.

The boundary line between this portion of Alaska and the British possessions has been laid down as near as possible at the uniform distance of 10 marine leagues from the shore line of the mainland from the head of Portland Canal to the intersection of this line with the one hundred and forty-first meridian. The clause in the Anglo-Russian treaty of 1825, which was adopted in our treaty with Russia in 1867 as defining this boundary, states that this boundary shall be a line commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54° 40′ north latitude, and between the one hundred and thirty-first and one hundred and thirty-third degrees of west longitude.

> The said line shall ascend to the north, along the channel called Portland Channel, as far as the point of the continent where it strikes the fifty-sixth degree of north latitude. From this last-mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the one hundred and forty-first degree of west longitude, and finally from the said point of intersection the said meridian line of the one hundred and forty-first degree in its prolongation as far as the Frozen Ocean; with reference to the line laid down in this article it is understood, first, that the island called Prince of Wales Island shall belong to Russia [now by cession to the United States]; second, that whenever the summit of the mountains which extend in a direction parallel to the coast from the fifty-sixth degree of north latitude to the point of intersection of the one hundred and forty-first degree of west longitude shall prove to be at the distance of more than 10 marine leagues from the ocean limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned [to the United States by cession], shall be formed by a line parallel to the winding of the coast, and which shall never exceed the distance of 10 marine leagues therefrom.

We have absolutely no data for locating the summits of the chain of mountains "running parallel with the coast;" it is not even certain that there is such a connected chain, and, consequently, it has been thought best for the purposes of this map to run the boundary in conformity with the last paragraph in the clause of the treaty mentioned, at a distance of "10 marine leagues from the seashore of the mainland," in expectation of a future settlement of this altogether too indefinite line by treaty or convention between the United States and the British Government.

A survey with a view of locating the boundary in accordance with the obtuse wording of the treaty would be altogether too costly, but a straight line between certain easily defined points agreed upon by mutual consent would solve a difficulty which promises to arise in the near future, owing to the discovery of valuable mineral deposits on the very ground placed in dispute or doubt by the old treaty.

It may be stated here that a line from the point above mentioned, on the fifty-sixth parallel, to the intersection of the sixty-fifth parallel with the one hundred and forty-first meridian would nearly follow the present line in southeastern Alaska, while it would give to the United States one of the head branches of the Yukon River—the main artery of trade of the continental portion of Alaska—which is now crossed by the boundary at a point considerably below the head of steam navigation.

The coast line from Cape Spencer northward to Mount St. Elias has been drawn in accordance with the Coast Survey chart of the Mount St. Elias alpine region from observations and triangulations of Assistant William H. Dall, who discovered important errors in the vicinity of Dry Bay and at other points. Minute descriptions of natives, confirmed by observations of Mr. Dall, induced me to change the contour of Icy Bay. From Cape Yaktag to the mouth of Copper River the old outline, based upon Tebenkof's Russian atlas, has been retained, but the mouth of Copper River, which has heretofore been represented as a wide estuary, I found to be filled with low islands intersected by narrow, winding channels. These islands were located by magnetic bearings only. In Prince William Sound the only change made consists in the relative position of the headlands of Montague Island, in accordance with my repeated personal

observations. The coast line of the sound is the same as on the Coast Survey charts of this section, which are based upon the surveys of Spanish, English, and Russian explorers.

In the Kenai Peninsula, the island of Kadiak, and Cook Inlet no change has been made with the exception of the location of villages or settlements in accordance with personal notes of the compiler.

The outlines of the Aliaska Peninsula are essentially the same as in all earlier maps based upon the surveys of Lütke, Sarychef, and others, with the exception of a few corrections in the Shumagin group of islands, which were furnished by the United States Coast and Geodetic Survey.

In the interior of the peninsula my observations enabled me to insert a few alterations along one of the chief portage routes from Bristol Bay to Shelikof Strait by way of the Naknek River and Walker Lake.

The Aleutian Islands are represented on this map in accordance with the charts of Sarychef and Tebenkof, with corrections to date by Assistant William H. Dall and party, of the Coast and Geodetic Survey.

The coast line from Bristol Bay to Cape Newenham is essentially the same as that found on the Coast Survey map of 1869, which latter is identical with that in Tebenkof's atlas.

In the interior of this section some details showing portage routes and settlements have been inserted from personal notes of the compiler.

The course of the Kuskokwim River has been retained as represented on the Coast Survey map of 1869, with the exception of a portion of its head waters corrected from Indian maps and the descriptions of traders.

The delta between the Kuskokwim and the Yukon mouths presents several striking and entirely new features, for which I am indebted to the discoveries of Mr. E. W. Nelson, United States Signal Service. Some years ago I was informed that the two deep indentations heretofore represented on all maps of Alaska to the north and south of Cape Vancouver do not in reality exist, and happily Mr. Nelson was in a position to confirm this report, and to furnish the real outline of the coast as laid down by magnetic bearings and close estimate of distances from points known and established. That gentleman, during a sledge journey performed in the winter of 1878–'79, struck the coast of Bering Sea at a point a little to the southward of Cape Romanzof, and, taking his departure from that well-established point, followed the coast to Cape Vancouver, another known point, and thence along the shore into the mouth of the Kuskokwim, finally cutting across the center of the delta to the banks of the Yukon.

This journey resulted in the important discovery that Cape Vancouver is located on an island formed by two wide channels uniting in a large inlet far inland. This island was named after the discoverer, while the name of Baird was bestowed upon the inlet above referred to, and that of Hazen upon the bay to the north of Nelson Island.[1]

Another important point confirmed by Mr. Nelson during his journey is that the central portion of this delta, where the compiler of the Coast Survey map of 1869 located a chain of mountains, consists in reality of a vast system of lakes connected by shallow and intricate channels.

The course of the Yukon is laid down on this map in accordance with the survey of Capt. Charles W. Raymond, United States engineers, who ascended the river to ascertain the position of Fort Yukon, which he found to be considerably to the westward of its location on the maps heretofore published.

For the course of the river between Fort Yukon and the British boundary I am indebted to magnetic bearings furnished by traders traveling on the steamer which ascends the Yukon to Fort Reliance, an American trading station. These bearings, confirmed by Indian maps and the descriptions of various intelligent individuals, when brought into connection with the change in the position of Fort Yukon bring Fort Reliance within our possessions, though heretofore it was

[1] In honor of Prof. Spencer F. Baird and Gen. William B. Hazen, under whose auspices Mr. Nelson performed his labors.

supposed to be on British territory, owing to deductions made from the erroneous location of Fort Yukon.

The course of the Tanana River and that of the portage routes connecting this little-known stream with the Yukon on the east and the Kuskokwim on the west are represented in accordance with Indian maps and a careful comparison of statements of many traders and intelligent natives; and a change has been made in the course of the Innoko, another tributary of the Yukon, in accordance with notes of a reconnaissance made by Mr. E. W. Nelson.

The positions of St. Michael and Stuart islands in Norton Sound have been corrected in accordance with observations of Lieutenant Hand, United States Revenue Marine, and Lieutenant Danenhower, United States Navy, of the Jeannette expedition, who determined the same to be considerably more to the westward. A slight difference exists between the observations of these two officers, but as the naval officer seems to have had better instruments, more leisure, and more favorable atmospheric conditions, I have accepted his location of St. Michael.

In comparing the authorities for the eastern coast of Norton Sound it was discovered that the charts of the United States Hydrographic Office contained an important error. A draftsman at that office in first laying down this coast line had made use of chart No. 2 of Tebenkof's atlas, on which the meridian lines were drawn at the half degree, a mistake which remained undiscovered by the Hydrographic Office, and the error resulting has been perpetuated in each succeeding issue of its charts of Bering Sea.

In the coast line of northern Alaska from Norton Sound to Bering Strait and along the Arctic shore the charts of the British Admiralty and the United States Hydrographic Office in their latest issues have been closely followed, with the addition of some details furnished by Capt. C. L. Hooper, United States Revenue Marine, and E. W. Nelson, United States Signal Service.

In running the boundary between the Alaskan and Siberian coasts a slight variation from charts heretofore published was made necessary, in accordance with the wording of the treaty, at a point where this line passes between St. Lawrence Island and Cape Chukotsk.

Wrangell Island is represented in accordance with the sketch of Lieutenant Berry, United States Navy, published with the latest chart of that region issued by the United States Hydrographic Office. The point where Capt. C. L. Hooper, of the Revenue Marine, landed and took possession in the name of the United States was named "Hoopers Cairn" on Lieutenant Berry's sketch, but the name had been omitted by the draftsmen of the Hydrographic Office. As an act of justice to the first man who set foot on this Arctic island I have restored it. The latest hydrographic charts of the Arctic adopt Professor Nordenskiöld's coast line of Siberia to East Cape, but with the assistance of the observations made by Captain Hooper during the summer of 1881 I have been enabled to make important corrections between Cape Serdze Kamen and Cape North. Professor Nordenskiöld passed along this section of the coast late in the season with thick and unfavorable weather, while Captain Hooper was favored with the finest atmospheric conditions and double observations of both midday and midnight sun.

The contour of East Cape of Siberia has been changed in accordance with a careful sketch furnished by the brothers Krause, of the Bremen Geographical Society, together with other details, the result of a boat journey along the east coast of the Chukche Peninsula. This change in contour, though radical, is based solely upon the discovery that what has been heretofore represented as an island on the north side of the "neck" of East Cape is really a sand pit separating a lake containing many islands from the sea. In this connection it may be stated that many of the names of villages collected by the brothers Krause are identical with those of a list furnished by a Cossack explorer at the end of the seventeenth century.

A careful comparison of all the accessible authorities during the slow process of compilation naturally led to the discovery of errors in many of the maps and charts consulted, but throughout this work it has been the experience of the compiler that the Russian atlas of Tebenkof, and to a certain extent the charts of Sarychef, furnish the most reliable material—in fact they are the basis of all maps of this vast territory. Wherever a point or coast line has been laid down as definitely known by Tebenkof, it may be relied upon as true in contour and latitudinal position.

A curious instance confirming this assertion presents itself in the case of the southernmost outlet of the great Yukon River—the Kashunok—indicated as a broad arm on "chart 2" of Tebenkof's atlas. Mr. William H. Dall, in compiling his map for the United States Coast Survey in 1869, omitted this feature, but examination proved the Russian geographer to be correct. The outlet exists, but is less broad than indicated by Tebenkof.

The large numbers of new names of settlements inserted in this map lie chiefly along the line of my personal exploration.

In the absence of all connected surveys of Alaska absolute correctness can not be claimed for any map of that country, but in presenting the result of my labors to the public I look upon this map as embodying new information and as an additional guide for future labors in the same direction.

THE GEOGRAPHY AND TOPOGRAPHY OF ALASKA.

The coast of Alaska commences in the south, at latitude 54° 40′, and sweeps in a long curve to the northward and westward for 550 miles to Prince William Sound, and thence southward and westward over 700 miles to the extremity of the Aliaska Peninsula, whence the Aleutian chain of islands stretches toward the coast of Asia in another long curve, with its convexity to the south. The highest latitude of that great bend of the main coast line north of Sitka is 60° 30′, while the southern point of the Aliaska Peninsula is in latitude 55°. From the Strait of Issanakh, which separates the peninsula from the island of Unimak with its great volcanic peaks covered with eternal snow, the Aleutian Islands sweep in a grand curve to the southward and westward for 750 miles, reaching a latitude of 51° 30′ in the meridian of Greenwich, and thence northward and westward 125 miles to Attu, the western extremity of the United States. The Aleutian Islands are certainly the summits of a continuation of the main Alaskan range of islands which sweeps along the Alaskan coast from the boundary around the head of Prince William Sound and Cook Inlet and down the Aliaska Peninsula. The whole chain, at least that part of it west of Mount St. Elias, is marked by many volcanic peaks, several of them still active. The mountains of the mainland between Cross Sound, the northern line of the Alexander Archipelago, and the east shore of the Kenai Peninsula are very high, Mount St. Elias measuring over 18,000 feet, Mounts Crillon and Fairweather being but little less in height. The peaks of the Chugatch Alps encircling the north side of Prince William Sound loom up grandly under their covering of eternal snow; and on the west side of Cook Inlet are found mountains reaching an elevation of from 10,000 to 12,000 feet. From the Ilyamna Volcano down the peninsula the peaks gradually decrease in height: Shishaldin, on Oonimak Island, measuring nearly 9,000 feet; the Makushin, on Oonalashka, over 5,000; and the remaining mountains of the chain to the westward varying from 3,000 to 6,000 feet in height. The north side of the Aliaska Peninsula presents a low and sandy shore. The great extent of water lying within the curve of the coast between the southern boundary and the southern end of the Kadiak Archipelago has been named by the United States Coast Survey the Gulf of Alaska. North of the Aliaska Peninsula the coast has a general northerly and westerly direction to Bering Strait, indented by three large bays or sounds—Bristol Bay, the Kuskokwim Estuary, and Norton Sound. In the Arctic the coast of Alaska turns eastward with the sole interruption of Kotzebue Sound, in latitude 66° north. The island of Nunivak, the Pribylof group, and St. Lawrence and St. Matthew Islands are situated off the coast of Bering Sea.

From Dixon Sound and Portland Canal, in latitude 54° 40′, to the Chilkat Inlet and Cross Sound, in latitude 59° 40′, the mainland is shielded from the sea by a vast archipelago of islands, large and small, most of them being mountainous throughout, and all covered with a dense growth of spruce, hemlock, and cedar. The dimensions of this great accumulation of islands average about 75 miles east and west and 260 miles northwest and southeast, divided by hundreds of navigable passages. The number of these islands is given as 1,100, divided as follows: Prince of Wales Island and those closely surrounding it number 135; from Portland Canal to Cape Caamaño there are 134; from Cape Caamaño to the middle of the Stakhin, 77; between Chatham, Frederick, and Stakhin straits, 350; Admiralty Island and those surrounding it number

118; Baranof and adjacent islands, 138; Chatham Strait, north of Admiralty Island, contains 29; and Chichagof and islands adjacent to Cross Sound, 109. The fiords of Norway and the "scheres" of Finland sink into insignificance before the great dimensions of these straits and sounds. Among the larger passages dividing this archipelago Chatham Strait, named by Vancouver, is the most important, stretching in a straight line 195 miles in a northerly direction from Cape Ommaney, in latitude 56° 10′, to the mouth of Chilkat Inlet, in latitude 59° 40′, with an average width of 7 or 8 miles and a great depth of water. Several large passages connect this water-way with other straits to the eastward and also with the sea north of Sitka. Of the latter, one called "Peril" or "Destruction" Strait leads directly to Sitka, while the other consists of Cross Sound or Icy Strait, about 75 miles north of Sitka. The Alexander Archipelago embraces a shore line of nearly 8,000 statute miles.

The outline of this section of Alaska is naturally a very irregular one, on account of the numerous straits, bays, and islands. The south coast, facing upon Dixon Sound and Portland Canal, and extending 80 miles from the latter westward to Cape Kaigan, exhibits numerous headlands and broken shore, steep hills, and mountains covered with dense forests to their summits. The mountains attain an elevation of from 2,000 to 3,000 feet, with scarcely a valley between them.

The extensive eastern arm of Dixon Sound, called Portland Canal by Vancouver, forms the southeastern dividing line between British Columbia and Alaska. It begins in latitude 54° 41′, and its northern head is in latitude 55° 45′ and longitude 149° 54′. The inlet is but a little over a mile in width.

On the island of Tongass, situated a little to the westward of the mouth of Portland Canal, a military post was established soon after the transfer of Alaska to the United States, but it has since been abandoned; a few of the buildings, however, still remain, surrounded by the eastern-most native villages of all Alaska. Cape Fox, the southerly extremity of the mainland within the American territory, is situated in latitude 54° 45′ 30″. From the north side of Dixon Sound several large passages extend to the northward—the Revilla Gigedo Channel, or Tongass Narrows, between Cape Fox and Cape Northumberland; Clarence Strait, between Cape Northumberland and Cape Kaigan; and Cordova Bay or Strait, between Cape Chacon and Cape Kaigan, having connection with Bucarelli Sound. The largest of these passages, Clarence Sound, runs in a northwesterly direction for 120 miles, with an average width of from 15 to 20 miles, and finally mingles its waters with those of Chatham Strait, its western shore being formed by Prince of Wales Island. Strange to say, this large island, which has been known to the maritime nations of the globe for over a hundred years, still remains unsurveyed, and has been variously named an island and an archipelago, and accounts of natives report numerous navigable passages cutting through it here and there. From the eastern side of Clarence Strait great arms penetrate in a general northeasterly direction until they reach the base of the coast mountains; their waters are navigable, the shores bold and covered with timber, and the whole forms an intricacy of inland navigation difficult to describe in detail, and a chart affords but a faint idea of its perplexing grandeur. There seems to be no harbor on the mainland in this vicinity. The port of Wrangell is located on an island of the same name a short distance from the mouth of the Stakhin River, in latitude 56° 31′ and longitude 132° 23′. The Russians had a small stockaded station here called Redoute St. Dionys, which was subsequently leased to the Hudson Bay Company.

After the acquisition of the country by the United States a military post was established here, but was finally abandoned in 1877. The Stakhin is the largest river of southeastern Alaska, but lies within our boundaries for a distance of only 30 miles in an air line from its mouth. The Dominion government claims a boundary even nearer to the seacoast, including the spot where British ocean steamers land cargoes and passengers, and the advent of the British here has destroyed the once large transit trade of Wrangell. The interior of the country adjoining this river is broken into a succession of sharply defined mountain ranges separated by narrow, deep valleys similar to those between the islands of the coast.

The topography of the Alexander Archipelago is the type of that of the interior within our

boundaries. Beyond, on the upper river, within the British possessions, there is a large rolling plateau stretching between the coast range in the west and the prolongation of the Rocky Mountains in the east. Like all Alaskan rivers the Stakhin takes its head from a succession of great lakes. A number of glaciers descend from the snow-covered peaks on both sides of the river down to its banks. The largest of these is situated on the right or west bank with its face on the river 4 or 5 miles in width, and its length is said to be over 60 miles. The Indians relate that in ancient times this glacier extended across the river, forming an icy arch over the stream, but in course of time the spring freshets washed away the obstruction. Some officers of the Russian navy attempted to explore this huge glacier to its head, but they probably fell into one of the numerous chasms, as they were never heard from again.

One wide passage from the mouth of the Stakhin to the ocean, called Stakhin Strait, runs westward between Prince of Wales Island on the south and the Kehk Archipelago on the north, reaching the sea between Cape Ommaney on Baranof Island and Coronation Island on the south. Another passage, Prince Frederick Sound, runs from the mouth of the Stakhin northward along the coast of the mainland, and then westward between Admiralty Island and the Kehk Archipelago until it empties into Chatham Strait. A branch of this channel, Stephens Passage, runs northward between the mainland and Admiralty Island until it mingles its waters with those of Chilkat Inlet. At about the middle of its course Takoo Inlet opens on the east, and a little beyond this Douglas Island divides the strait into two channels. This is the locality where the most promising discoveries of gold placer and quartz mines have thus far been made. Juneau City, or Harrisburg, a mining town of recent growth, is situated on the mainland opposite Douglas Island. From the junction of Stephens Passage, Chilkat Inlet, and Chatham Strait, a wide channel, called Cross Sound or Icy Strait (by the Russians), opens between the mainland in the north and Chichagof or Hoonia Island on the south. A large bay, not heretofore represented on any chart, was definitely located last year on the northern side of Cross Sound by the officers of the United States sloops of war *Jamestown* and *Wachuset*. Glacier Bay extends in a northwesterly direction from the north shore of Cross Sound, between Lynn Canal or Chilkat Inlet and the Pacific, for a distance of about 40 miles. About 20 miles from its mouth there is an island 5 or 6 miles in length named Willoughby Island, and around the shores of the bay are 5 immense glaciers. The first, in the vicinity of Willoughby Island, is about half a mile wide and 150 feet high; the next is about three-quarters of a mile wide and 200 feet high; the third, known among the Indians as the "great glacier," is situated at the head of the bay, and is about half a mile wide and from 200 to 300 feet high; the fourth, on the northern shore of the bay, is about half a mile wide and 150 feet high; and the fifth and smallest is about half a mile wide and 50 feet high. Nearly all the ice floating in this bay and Cross Sound comes from these glaciers; the sea washes under them, honeycombs the ice by its incessant lapping, and pieces are broken off constantly. Prof. John Muir, an eminent geologist of the Pacific Coast, describes another huge glacier located here, as follows:

> On the northern shore of Glacier Bay, north of Willoughby Island, there is a large inlet, from 3 to 4 miles wide at its mouth. It runs to the northward and westward 5 miles, and at its head there is an immense glacier which extends across the head of the inlet for a distance of 3 miles. Ten miles back from its face it is 10 miles wide, and near this, its greatest width, sixteen branches of the first class unite to form one immense glacier. Four of the sixteen branches are each over 2 miles wide, while nearly all have tributaries. The distance from the face of the glacier to its farthest removed fountain is about 40 miles.

The port of Sitka is situated on the west coast of Baranof Island, in latitude 57° 02′ 52″, and longitude 135° 17′ 45″.

Westward of Cross Sound the Coast Mountain range attains an elevation of about 18,000 or 19,000 feet, covered far down with perpetual snow, the highest peaks (Mounts St. Elias, Fairweather, and Crillon) looming up in silent grandeur above them, visible in clear weather a distance of 150 miles at sea. From Lituya or Port des Français westward the immediate seacoast is comparatively low, wooded ground, but closely backed by icy declivities that come down from the high mountain ranges, and at the head of Yakutat Bay reach the coast land.

This narrow strip of low coast, interrupted only in the vicinity of Icy Bay by a succession of precipitous glaciers fronting the sea for 15 or 20 miles, extends to the mouth of Copper River. Here the sediment carried down from the mountains has been deposited for thousands of years, until a vast low delta has been formed, through which the waters of the river find their way to the sea in innumerable channels. In many places the swift current has carved large basins and lagoons out of this soft material, the whole presenting the spectacle of a perfect labyrinth of lakes and streams. The mountains rise up abruptly from the northern edge of this flat to a height of 8,000 or 9,000 feet.

Vistas of the far interior are afforded here and there by the gradually sloping masses of glacier ice. West of the Copper River the foot of the Chugatch Alps is bathed by the sea without any intervening lowland, with only two or three exceptions, and these have been utilized for the location of settlements. The mountains on the northern side of Prince William Sound must reach a height of 10,000 or 12,000 feet, all densely wooded up to about a height of 1,000 feet, and covered with eternal snow from their summits to within 3,000 or 4,000 feet of the sea level. The interior of Prince William Sound on the Gulf of Chugatch forms a basin almost entirely landlocked, being sheltered from the south by the islands of Nuchek and Montague; but although thus surrounded on all sides by land it is by no means a calm and pleasant sheet of water to navigate, as furious gales and "woollies" sweep down the mountain sides without a moment's warning, compelling the luckless traveler in a small craft or canoe to seek the lee of one of the hundreds of islands and capes studding the coast. Immense glaciers on the northern shore are constantly descending into the sea and shedding fragments of ice, both large and small, that are carried off by the tide in compact fields or loose masses, still more endangering navigation. The western shore of the sound, the northeast coast of the Kenai Peninsula, is very much cut up into deep bays and fiords, and everywhere mountains can be seen looming up in the background with snowy peaks and ridges. The deepest indentation in this section of the coast of the peninsula is Resurrection Bay, which was long years ago utilized by the Russians as a shipyard. This bay affords the only harbor in the vicinity, though its entrance is beset with islands and the approach made difficult to sailing vessels. From Resurrection Bay in a southwesterly direction the coast is one succession of deep fiords, but, exposed as it is to the fierce easterly gales prevailing here at nearly all times of the year, it is shunned by navigators, especially because even the deepest and most extensive bays do not afford a single anchorage, so that vessels entering them to find refuge from storms would still be at the mercy of the tides.

The entrance to Cook Inlet, or the Gulf of Kenai of the Russians, lies between Cape Elizabeth on the southwestern extremity of the Kenai Peninsula and Cape Douglas, a bold promontory jutting out from the Aliaska Peninsula. Nearly halfway between the two is a group of bleak, naked rocks called the Barren Islands, which, placed as they are in mid-channel of the tide rushing into Cook Inlet from the ocean, cause violent and irregular tidal currents very dangerous and perplexing to the navigator. During calm weather the so-called "tide rip" will toss a craft about more violently than any sea stirred up by wind, and a sailing vessel caught within a few miles of the Barren Islands in the "tide rip" without wind is irresistibly drawn to destruction upon the rocks.

Just above its mouth the waters of Cook Inlet widen out into the Gulf of Kamyshak on the west and Kuchemak Bay (called "Chugachik" on the Coast Survey maps) on the east. On the east shore the mountains are not high, and contain extensive coal veins of an inferior quality, but on the west the main Alaskan chain of mountains rears up several volcanic peaks to a considerable height, rising abruptly from the seacoast with a narrow belt of shelving woodland intervening. North of the indentations mentioned the shores of Cook Inlet again approach each other to a distance of not over 30 miles between Anchor Point on the east and Mount Isaac on the west. From this point northward and eastward the eastern shore is low and flat, with an elevation of from 50 to 100 feet above the sea. High ridges of mountains traverse the interior and eastern side of the Kenai Peninsula, but between them and the coast there is a strip of marshy tundra, wooded along the river courses and varying from 40 to 50 miles in width. As the inlet

contracts still further, especially between the promontories of East and West Foreland, the tides increase in velocity and violence of action until they attain a speed of 8 or 9 knots, with an average vertical rise and fall of 24 to 26 feet.

The northeastern extremity of this vast inlet or gulf which Cook entered with the expectation of finding a northwest passage, and being disappointed, applied to it the name of "Turnagain," equals in tidal phenomena the Bay of Fundy. The flood comes in in a huge "bore," with thundering noise and astonishing rapidity, and a traveler advancing with it in a canoe experiences the peculiar sensation of seeing one high bank of clay and gravel after another apparently sinking before him as he is lifted up and carried over by the inpouring tide. From the mountains surrounding this branch of the inlet innumerable avalanches sweep down their rocky and wooded slopes, demolishing large sections of forest and piling up rocky débris to such an extent as to cause frequent and total changes in the aspect of the country, while the outlines of the coast undergo equally perceptible modifications from the action of the tides.

What the country north of Cook Inlet is like no civilized man can tell, as in all the years of occupation of the coast by the Caucasian race it has remained a sealed book. The Indians tell us that the rivers lead into lakes and that the lakes are connected by rivers with other lakes again, until finally the waters flow into the basins of the Tanana and the Yukon; but conflicting with this intermingling of the waters are stories of mountains of immense altitude visible for hundreds of miles. The natives living north of this terra incognita give, however, a similar description, which may be accepted until reliable explorers are enabled to penetrate this region.

On the western side of Cook Inlet the main Alaskan chain of mountains, called by Dall the Chigmit Range, rises abruptly from the sea in steep ridges and peaks, the highest of the latter being the Redoubt and the Ilyamna mountains, both volcanic and emitting smoke. Only at two points along this coast within the inlet does lowland intervene between the mountains and the shores, at Toyonok and at Kustatan, both of which localities have been utilized by the natives for establishing settlements. Up to the height of about 1,000 feet all these mountains are densely wooded. From Kamyshak Gulf, situated between Mount Isaac and Cape Douglas, a portage is made over a slight depression in the ridge to the basin of the great Lake Ilyamna, but on the southwestern shore of the bay the mountains rise again to a considerable height, culminating in the four peaks to the westward of Cape Douglas. The last-named cape is one of the most prominent and boldest in shape of the many Alaskan promontories, jutting out as it does at a right angle for a distance of several miles into the sea, with a sudden descent of over 1,000 feet into the waves of Cook Inlet.

The same chain of mountains extends down the south coast of the peninsula, varying in height between 5,000 and 8,000 feet, with peaks much eroded by glacial and meteorological action. The numerous glaciers existing throughout the upper regions of this mountain chain do not anywhere approach the sea coast, as is the case with Mt. Saint Elias and the Chugatch Alps, these formations being found only at high altitudes, generally facing westward and southward.

Two distinct and continuous lines of "watermark" can be observed along the whole of this chain, one at an altitude of 1,000 feet, the other perhaps 500 or 600 feet above. Both of these lines show the effects of the wash of the ocean for ages, together with many petrifactions of mollusks and other marine life. The natural conclusion forced upon the observer is that the whole peninsula of Alaska has undergone two successive periods of elevation from volcanic action, and that this region would afford a highly interesting field of research to geologists. It is a significant fact that no glacial action is observable below the upper sea-level.

The immediate sea coast here is cut up into innumerable fiords and coves, and lined with rocky islets.

The term "mountain chain" applied above to the elevated portion of the peninsula does not, perhaps, quite describe a very peculiar formation. The mountains or mountain groups are interrupted from time to time by depressions, but these do not at all bear the character of mountain passes, as they consist of low, marshy plains, extending entirely across the peninsula, varying very much in width. A similar formation can be found on the coast of Prince William Sound, where outlying spurs of the main chain are frequently divided in the same way. The impression

created in the mind of the beholder is not that of a continuous alpine chain, but rather of a series of islands, such as the Aleutians, raised by successive volcanic action until the straits between them are left dry. These depressions serve as the portage routes across the peninsula. A careful observer could easily recognize distinct islands in the mountain groups of Morshovia and of Belkovsky, connected with each other and with the Pavlosk volcanic group only by low, swampy isthmuses. Again, the mountain groups opposite the Shumagin Islands, containing the Veniaminof and other volcanoes, loom up, entirely isolated by similar depressions, north and south. Between Moller and Zakharof bays the portage is made in half an hour from the waters of the North Pacific to those of Bering Sea.

Other swampy passages lead through from the Bays Chigmik and Kishulik to the north coast of the peninsula. Nearly all these isolated mountain sections bear a peculiar resemblance to the outward shape of the island of Oonimak, the first of the Aleutian chain that is actually separated from the peninsula, though only by a strait too shallow to be navigable. That an elevation of this region has taken place is confirmed by abundant evidence, and altogether it does not seem at all improbable that what now resembles from a distance a long mountain range was once a chain of islands.

At Cape Atushagwik the coast of the peninsula approaches nearest to that of Kadiak Island, the width of the strait here being only a little over 18 miles.

In the vicinity of Katmai both coal and petroleum have been found, but not abundant in quantity or excelling in quality.

The volcanic group of the Pavlosk Mountains stands, as already mentioned, entirely isolated with its two craters, of which one is still active, while the other is reported to have been extinct since the year 1786. From this region also samples of coal of inferior quality have been procured. South of Pavlof Bay another volcano rears its jagged crown, separated both north and south from the mountains.

In the neighborhood of Belkovsky and Morshovia several volcanic peaks can be observed, but they have not been active within historic times.

On rounding the southern extremity of the peninsula and turning northward and eastward a total change in the aspect of the coast can be observed. Low, sandy reaches and slightly elevated moorlands cover the wide interval between the mountains and the shores of Bering Sea, interrupted here and there by lake-fed streams and rivers. In the vicinity of Ougachik the volcanic character of the country disappears entirely, the rock formation being altogether of granite and quartz, and pumice stone and chalk are only washed up by the sea. All along the coast from here we encounter gray granite, hornblende, serpentine, porphyry, and sandstone, but all along, at an altitude of about 300 feet above sea level, parallel strata containing fossil bivalves appear on the faces of bluffs. As we advance northward the interval between mountains and seacoast widens, until in the vicinity of Lakes Walker and Ilyamna swampy plateaus nearly 100 miles in width are found, dotted with many lakes.

Proceeding northward along the coast of the mainland the first deep indentation of the shore line is Bristol Bay, into which the waters of Lake Ilyamna flow through the Kvichak River. From the southern extremity of the Aliaska peninsula to this point Port Moller affords the only harbor for shipping, though three rivers, the Sulina, the Igagik, and the Naknek, flow into Bering Sea from the mountains in the east. In the vicinity of the mouths of the last two streams the shore is high and rocky, but only few traces of volcanic action can be discovered. North of Lake Ilyamna high mountains of the main Alaskan range protrude between that sheet of water and the Nushegak River, its spurs approaching nearest the coast immediately behind the Nushegak post and settlement. Other spurs of the same range of mountains and isolated groups of hills appear at long distances from each other on the coast of Bering Sea, the intervals being filled up apparently with alluvial, swampy soil, not altogether level, but gently rolling. The earliest intelligent observer of this region, the Russian missionary Veniaminof, described the conformation of this section of the country as follows:

Slight elevations can be found along the whole extent of the American coast of Bering Sea; they are in nearly all cases connected with the mountains in the interior. If the observer ascends to a height the country appears to

him like a heaving ocean suddenly become stationary, with its waves transformed into sand and mud; these waves are now covered with vegetation, but their outlines are still very striking. In the midst of this dry sea we find occasionally high, rocky islands entirely separated from the neighboring hills.

To the westward of Nushegak the mountains first reach the coast on both sides of the Bay of Kulluk. The summits of this range as seen from the lakes forming the portage between the bays of Kulluk and Nushegak are very jagged in outline, rising abruptly in almost perpendicular blocks and peaks too steep to afford lodgment for the snow. The capes and headlands jutting out from this range into the sea are frequently composed of sandstone worn into fantastic shapes by the action of the tides and changes of temperature. The next great elevated headland is Cape Newenham, which forms the terminal point of a rather low range of hills running parallel with the left bank of the Kuskokwim, west of the Tuluksah River. At Cape Newenham these hills culminate in two towering peaks between 2,000 and 3,000 feet in height. Between this point and Cape Vancouver in the north the country on both sides of the wide estuary of the Kuskokwim is evidently of an alluvial formation, low and swampy. Both at Cape Vancouver and on the island lava is found, in addition to many other evidences of volcanic origin; and the same is true of the islands farther off the coast—St. Matthew and St. Lawrence. At Cape Rumiantzof, in latitude 61° 47′, is another aggregation of volcanic hills rising like mountainous islands from the tundra.

The delta of the great Yukon is of course entirely alluvial, with the exception, perhaps, of the isolated hills of Kusilvak, which give indications of volcanic origin. From the northern mouth of the Yukon eastward the south coast of Norton Sound consists of low, rocky hills of lava and basalt. Between the small streams of Pastolik and Pastalak are high bluffs of basalt, and the sandstone cape of Vsachaghik looms up between 400 and 500 feet from the sea level. The islands of St. Michael and Stuart are comparatively recent lava formations, and contain several extinct craters. The traditions of the natives here speak of the island of St. Michael as having risen from the ocean, and old people living in Tebenkof's time related to him that twice within their recollection the whole island was covered by the sea. From St. Michael northward the chain of low hills composed of lava and basalt runs parallel with the coast, averaging in height from 200 to 300 feet, but at a distance of about 30 miles inland a few peaks attain a height of between 1,000 and 1,500 feet. At Cape Denbigh a granite formation appears, jutting out into the sea at a right angle with the volcanic range of hills. The shores of Norton Bay are low and all the alluvial deposits contain bones, tusks, and skeletons of the mammoth and mastodon. In the north coast of Norton Sound we find the deep indentation of Golovin Bay between two high points, Cape Derby and Stony Cape. The interior at the head of Golovin Bay is low, and a portage route extends thence by means of lakes and rivers to Grantley Harbor. From Stony Cape to Cape Rodney the shore is low and level, but in the interior a few high mountains are visible, covered with snow.

Off the coast, not far to the eastward of Cape Rodney, there is the small island of Aziak or Sledge Island. It has a circumference of only 12 miles, and is covered with large blocks of granite and basalt. The island contains a small village and is the favorite trading mart of the Innuit tribes of both continents. Still farther to the north, opposite to the entrance of Port Clarence, lies King Island, a precipitous mass of rocks some 700 or 800 feet in height, inhabited by about 100 Innuits who have carved their dwelling places into the almost perpendicular sides of the cliffs at a height of over 50 feet from the sea level. Only one or two narrow paths lead up from the water's edge to this northern Gibraltar, which also bears traces of volcanic origin.

Port Clarence consists of two capacious basins, the outer one sheltered from the sea by a long semicircular tongue of land of alluvial formation. The inner basin, Grantley Harbor, is surrounded by deep cliffs of slate; and from its head or eastern extremity the portage route leads to Golovin Bay, as mentioned above. A chain of hills from 2,000 to 3,000 feet in height extends from Port Clarence on the coast north northwest, terminating in Cape Prince of Wales. The formation of this cape appears to be basaltic, its almost perpendicular lines being frequently interrupted by steep, narrow guiches through which small streams find their way to the sea from the swampy table-land above. In about midchannel between Cape Prince of Wales and East Cape

lies the Diomede group, consisting of three small islands, of which two are within the United States boundary. They all rise abruptly from the sea to a height of a few hundred feet, but are level on top.

From Cape Prince of Wales eastward and northward the coast is low and swampy until we reach the vicinity of Kotzebue Sound and Choris Peninsula, where ridges of slate and chalk appear on the coast, generally running parallel with it. The inner shores of the great estuary of Kotzebue Sound are generally low, the gravelly soil resting upon a foundation of blue clay. Occasionally this blue clay rises into bluffs of a few hundred feet in height, and the whole formation contains numerous fossil remains of the mammoth and mastodon. The few small islands within the inlet are isolated masses of granite covered in sheltered localities only with a thin coating of sphagnous vegetation.

Kotzebue Sound is by far the best harbor in this section of the Arctic Ocean, and is much frequented by whalers and illicit traders in liquors and arms. Proceeding hence northward we find several chains of saddle-shaped hills interrupted here and there by wide depressions, a few pyramidal peaks, and steep, isolated rocks. The general formation of these is said to be slate and clay. At Cape Lisburne the cliffs rise abruptly to a height of 850 feet above sea level. Here also slate and chalk seem to predominate, but a short distance to the eastward carboniferous veins of considerable width appear in horizontal layers along the sandstone cliffs overhanging the seashore. The same formation continues from here eastward to Point Barrow and the eastern boundary of Alaska, receding occasionally to a distance of 10 or 15 miles from the seashore, and then advancing again, forming steep but low capes and headlands, the most prominent of which is Point Barrow, in latitude 71° 22′.

To complete the description of the topographical and geographical features of continental Alaska it is necessary to follow up the basins of the Yukon and Kuskokwim rivers. The Yukon delta, as already stated above, is altogether alluvial, but between Oonalakleet, on the east shore of Norton Sound, and the Yukon River there is a chain of hills consisting of granite and slate forming the watershed between the Oonalakleet River and the Anvik, a northern tributary of the Yukon. East of the Anvik the mountains increase in height until in the vicinity of Ikogmute, where on the right bank of the river a few peaks rise to a height of 2,500 feet.

The best description extant of the topography of this river is that of Capt. C. W. Raymond, United States Army, which covers the distance between Fort Yukon and the Russian mission at Ikogmute, just mentioned. Captain Raymond states that Fort Yukon is situated in latitude 66° 33′ 47″ and longitude 145° 17′ 47″, at a point where the Yukon receives the waters of the Rat or Porcupine River, a large tributary emptying on the right bank and flowing from its head waters in a general direction a little south of west. From Fort Yukon to the mouth of the Chetaut River, a distance of about 200 miles, the river has a general direction about west southwest; the country on both sides of the stream being low and level, usually consisting of sand or gravel. The average width of that portion of the river is about three-quarters of a mile, but in some places, measured across its numerous islands, it widens out to 5 or 6 miles. The current through all its passages is extremely rapid, and in many places the deepest channel does not carry more than 3 feet of water. Vegetation on the banks and islands is principally small willow and poplar, with occasional groves of spruce and birch. The principal tributaries in all this section of the river flow from the north, but none of them seem to be of much importance, and no native villages are known to exist.

From the mouth of the Chetaut River, however, the Yukon rapidly changes its character; the islands disappear, the banks rise into hills, and the stream gradually narrows into one channel, deep and rapid, until it finally rushes with great velocity through the Rampart range of hills. The bluffs composing this range rise abruptly from the water's edge, and are composed principally of a hard, greenish rock, though slate is occasionally observed, and at the principal rapids a ledge of granite crosses the river. Most of the hills are covered with groves of spruce and birch, but the trees are small, and in many places they lie for some distance scattered in every direction, showing the small depth to which their roots descend in the frozen ground and the great force of the prevailing winds. From the Chetaut River to the Rampart rapids, a distance of some 60

miles, the Yukon flows in a direction nearly northwest, and averages about two-thirds of a mile in width, which decreases at the rapids to about 150 yards. The tributaries emptying into this section are also chiefly from the north and small in volume.

The first native village met after descending from Fort Yukon is situated just below the rapids. From here to Nulato, a distance of some 240 miles, the river has a general direction about west by south. There are, however, many bends, although they are less sudden and numerous than in other portions of the river. After leaving the Rampart Range the river widens again and diminishes in velocity. The right bank is generally hilly and abrupt, and on the left, though the shore is generally low or flat, the hills and bluffs occasionally approach the water's edge. The average width of the channel is about three-quarters of a mile, but occasionally groups of low islands cause a widening of the river. About 50 miles below the Nuklukaiet station a range of mountains appears on the right bank. This is a succession of well-defined peaks and ridges, describing a beautiful curve of many miles, with its concavity toward the river and its flanks resting upon the water's edge.

All this bank is well-timbered with spruce, poplar, and birch. The principal tributaries emptying into this section of the river are as follows: From the north, the Tozikakat, the Novikakat, the Melozikakat, and the Koyukuk, and from the south the Tanana and a few smaller streams. The most important among these tributaries in size and beauty—in fact, chief among all the tributaries of the Yukon—is the Tanana, the river of the mountains. It empties into the Yukon about 30 miles below the Ramparts, and its turbid waters increase the current of the main river for a long distance. It flows apparently in a generally northwestern direction, its head waters approaching the Upper Yukon within five or six days' "Indian" travel. The mountains overhanging its upper course are said to be steep and to contain auriferous deposits or veins; and samples of surface gold from this section have been exhibited. At the mouth of the Tanana is the great trading ground called Nuklukaiet, where the Indians inhabiting the banks of this tributary are accustomed to congregate in the spring and meet the white traders and the few scattered bands of natives roaming over the hunting grounds between the Yukon and the Kuskokwim. Not far east of Nulato the Koyukuk empties into the Yukon from the north, forming a route of traffic between the river and Kotzebue Sound. From Nulato, situated some 50 miles south of the mission, to Andreievsky, the distance is about 350 miles, and the river has the following approximate directions: From Nulato to Anvik, south southwest; from Anvik to the upper entrance of the Chageluk slough, south southeast; from the upper entrance of the slough to the great bend, southwest; from the great bend to Andreievsky, west by south. It is difficult to convey an idea of this portion of the river, as its numerous windings, its hundreds of islands, its bars and shoals, ever changing and shifting, baffle the traveler in his search for a navigable channel. Generally speaking, the right bank is high, exhibiting many bluffs of sand and rock much eroded by the ice torrents of the spring. The ice sometimes undermines the high banks to a distance of 20 or 30 feet, and the trees standing on the projecting tops of the banks are loosened by the action of frost and water and precipitated into the stream beneath, and thus the river goes on widening and shoaling, and floating immense quantities of driftwood down to the sea. Sometimes the right bank rises into high hills, but the left bank is generally low and level; here and there, however, a few isolated hills are seen standing back a mile or two from the water, and for nearly the whole distance a range of distant mountains parallel to the left shore is visible. In these mountains lie the upper branches of the great river Kuskokwim.

Sandstone and slate continue throughout this portion of the Yukon Valley, but on the lower part a dark volcanic rock makes its appearance. Between a point near Andreievsky and the sea no rocks can be found anywhere along the river. The hills on the right bank are generally well covered with spruce and poplar, occasionally intermingled with a little birch, but owing to the coldness of the winter these trees seldom grow to great size. The left bank, on the other hand, is generally covered with a low thicket of willow and alder. This section of the river has few tributaries of importance, but there are many small streams, entering usually from the north. The principal streams are the Takaiak, which empties into the Yukon about 50 miles below Nulato,

and the Anvik, debouching from the north about 160 miles below that point. The latter has its source in the mountain ranges which run parallel with the seacoast; its banks are high and steep, and the very shallow waters run with great velocity. Two rivers empty into the Yukon in this vicinity from the south—the Kaiukak River, about 40 miles below Nulato, and the Chageluk. About 130 miles below Nulato the Yukon separates into two branches, the main stream pursuing a southerly course, while the lesser branch, running at first a little south of east, makes finally a great bend to the south and west and enters the main river again about 60 miles below the point of separation. This lesser branch is called Chageluk Slough, and into it, a few miles from its entrance, empties the Chageluk or Innoko River. A little below Andreievsky the Yukon bends abruptly to the north and runs about north by west from this point to the sea. The three principal outlets of the great river are the Ap-hun or upper, the Kvikhpak or middle, and the Kusilvak, or lower mouth. The Ap-hun outlet is about 40 miles in length and has an average width of perhaps one-third of a mile.

Of the upper portion of the Kuskokwim River I have no authentic reports, but the natives relate that along its several branches the country is a level plain encircled on all sides by tremendous mountains. All through its upper course the current is said to be exceedingly sluggish, but at some point east of the last known settlement of Napaimute there must be a break through some natural barrier, causing a rapid descent and corresponding increase of velocity of the river. From this point to the great bend in the vicinity of Kaltkhagamute the Kuskokwim runs nearly due west.

The mountains eastward of the Rédoute Kalmakovsky are high, heavily timbered around the base, and give ample evidence of the presence of mineral deposits; veins of quartz, cinnabar, and other ores being easily traced wherever the slopes and bluffs are exposed to view. Throughout the whole valley of the river the observer is struck with the wide difference existing between this formation and that of the Yukon. The bed is hard and gravelly throughout, and the vegetation on its banks more profuse and of greater variety than we find it on the larger river. About 200 miles from its mouth the Kuskokwim makes a bend to the southward, and from this point the hills disappear gradually, and at the same time the forests of alder and spruce recede from the banks until for the last 150 miles of the river course endless marshy plains extend on both sides as far as the eye can see. Between the Yukon and the Koskokwim, west of the general portage route, there is a vast system of lakes connected by streams with both rivers, but of this region very little is known beyond the fact that it is thickly settled by people holding little intercourse with their neighbors inhabiting the river basins.

Turning now to the islands of western Alaska we begin with the Kadiak group, consisting, in addition to the large island from which it takes its name, of the islands of Shuiak, Afognak, Malina, Marmot, Spruce, Ougak, Satkhlidak, Nazikak, Sitkhinak, Tugidak, and Ouganik, beside a number of others too small to mention by name. All of these islands are covered with mountains and hills, a few of them looming up between 2,000 and 3,000 feet into the region of eternal snow. From the northern extremity of Shuiak to a line from the head of Ougak Bay or Eagle Harbor to Ouganik Bay on the west coast the islands are heavily timbered with spruce, attaining in some localities a large size. This timber line is quite sharply defined, though along the water courses throughout the group a stunted growth of creeping willow exists, and a heavy carpet of grasses and moss covers the hills and mountains to the very summits. The geological formation consists chiefly of slate, porphyry, and basalt.

The bays indenting this group of islands are numerous and deep, affording the greatest facility for small fishing and trading craft. The most important at the present day is that of St. Paul Harbor, on the northern side of the Gulf of Chiniak, protected from the sea by Long and Wood islands. A short distance south of Chiniak Bay is Eagle Harbor or Ougak Bay, connected by a series of lakes with another deep fiord still farther south, the Bay of Killuda. This harbor is again connected, by a sheltered passage between the islands of Kadiak and Satkhlidak, with the harbor or bay of Three Saints, where the first permanent settlement of the Russians on Kadiak was located. Next in order is the Bay of Kaguiak, a capacious basin sheltered from all but north winds. Passing around the southern end of Kadiak Island we come to the

large Bay of Alitak, whence westward and northward a long reach of rocky coast extends without indentation or harbor of any kind until we pass the great fishing station of Karluk River and enter the Bay of Ooiak, the deepest fiord on the island, divided from the Bay of Killuda on the eastern side by only a narrow range of hills. To the northward of this bay there is one other indentation on Kadiak Island, the Bay of Ouganik, divided into two arms by the island of the same name, and one large bay on the west side of Afognak Island, named Paramonof Bay. With the exception of Spruce and Wood islands the smaller islands of this group are uninhabited, and serve only as hunting grounds for the inhabitants of Kadiak and Afognak.

Southward from the Kadiak Archipelago are the Semidi group and the island of Ookanok (also called Chirikof Island). They are hilly and evidently of volcanic origin, earthquake shocks being still of frequent occurrence. In the autumn of the year 1880, when the inhabitants of Sitka, 600 miles to the eastward, were startled by a violent earthquake, similar phenomena were observed on these islands, while no subterranean movement was felt at Kadiak and the adjoining islands.

The next large group of islands is the Shumagin, consisting of the islands of Ounga (the most important of the group), Popof, Korovin, Andromika, Nagai, Great Koniusha, Little Koniusha, Simeonof, Nuniak, and a number of small rocky islets. This group, which received its name from Bering during his second voyage, bears indications of volcanic origin, great changes in the elevation of points and headlands having taken place within historic times. In geological formation they are nearly all alike, consisting of slate and porphyry, but on Ounga Island are extensive veins of bituminous coal. The product of these veins has, however, been declared unfit for steaming or manufacturing purposes, and, after expensive experiments continued through a long series of years, the mines have been finally abandoned. The most important codfish banks now utilized by San Francisco fishermen in Alaska are located in the immediate vicinity of the Shumagin group. Between the Shumagin Islands and Oonimak, the first of the Aleutian group, the sea is dotted with a multitude of islands, reefs, and rocks of volcanic origin too numerous to describe in detail; they form the most important sea-otter hunting ground of all Alaska, extending from Peregrebnoi Island in the north to Sannakh in the south.

The island of Oonimak is about 60 miles in length, extending from northeast to southwest, closely resembling in its general formation the Aliaska Peninsula, from which it is separated only by a shallow strait. The most prominent features of this island are its two volcanic peaks, the Shishaldin, rising in one elegant pyramid to a height of between 8,000 and 9,000 feet, and the Pogromny, between 5,000 and 6,000 feet in height. The whole island has been described as the vault of a subterranean smelting furnace with many chimneys through which flames, sparks, and ashes ascend from the molten masses beneath. It has been and is still the theater of the most constant volcanic action in all Alaska. In the earliest times since the discovery of the island by the Russians whole ridges of mountain peaks have been observed to split open and emit huge flames, torrents of lava, and clouds of ashes. These manifestations were always accompanied by the most violent earthquakes, tidal waves, and floods, the latter caused by the sudden melting of masses of ice and snow on the mountain tops. The greatest activity on record occurred in 1796, 1824, and 1825, and as late as 1827 burning lava was observed descending from the craters. Oonimak has also from time immemorial been the Aleutians' great storehouse, from which they obtain sulphur and obsidian, the latter being employed in the manufacture of knives, spears, and arrowhead . The Russian missionary, Veniaminof, who witnessed one of these eruptions in the year 1825, describes the event as follows:

On the 10th of March, 1825, after a prolonged subterranean noise, resembling a heavy cannonade, which was plainly heard on the islands of Oonalashka, Akoon, and the southern end of the Aliaska Peninsula, a low ridge on the northeast end of Oonimak opened in five places, with violent emissions of flames and great masses of black ashes, covering the country for miles around. The ice and snow on the mountain tops melted and descended in a terrific torrent 5 to 10 miles in width on the eastern side of the island. Until late in the autumn the sea on that coast was turbid after this eruption. The Shishaldin crater, which up to that time had also emitted flames, continued to smoke only, while about midway between summit and base a new crater was formed, which was still smoking in the year 1831. On the 11th of October, 1826, a small peak in the interior of the island opened under violent explosion of fire and a rain of ashes, which covered not only the southern end of Aliaska Peninsula,

but Sannakh and Ounga and other adjoining islands. Since that time smoke comes out of many places among the loose masses of rocks on the mountain side, and all the streams and ponds in the vicinity are hot enough to emit steam in midsummer.

Between Oonimak and Oonalashka there is a group of islands which was formerly named the Krenitzin group. The most important of this group are Avatanok, Tigalda, Ougamak, Akoon, Akutan, and Ounalga. The latter island has no high mountains, but is very rocky, and its coast consists of steep, almost inaccessible cliffs. The island of Akutan is nearly circular in form, and has a group of mountains culminating in a volcanic peak 3,300 feet in height. Smoke still issues occasionally from the crater, the inner side of which is lined with deposits of sulphur of great purity, and many hot springs emerge from the fissures and crevices, in one of which the temperature is sufficiently high to boil meat and fish. The island of Akoon is comparatively low, but smoke can be seen to ascend from one of its peaks. The natives report deposits of coal in the southeast side of the island, and Tigalda, high and rocky at its south end and level in the north, also exhibits a carboniferous formation.

The great island of Oonalashka, the most important of the Aleutian chain, is about 120 miles long and 40 miles wide. Three separate groups of mountains occupy the coast and interior—the Makushin group, consisting of two parallel chains running northwest and southeast, between the Bay of Makushin and Captain Harbor, with the volcanic peak of Makushin 4,000 or 5,000 feet in height; the Bobrovoi or Otter Mountain, extending from northeast to southwest, between Captain Harbor and Beaver Bay, and the Koshigin Mountains, extending through the southern portion of the island from northeast to southwest. The snow never leaves the summits of these mountains.

The volcano of Makushin lies about 20 miles north of the anchorage in Captain Harbor and is an almost perfect cone in shape, blunted a little at its apex, where the crater is located. No flames or lava have been emitted by this volcano in the memory of several generations; but smoke still issues at brief intervals, and earthquakes and subterranean noises are of frequent occurrence. Russian naval officers, who visited the island at long intervals in the early part of this century, assert most positively that many of the points and ridges changed entirely in outline owing to this volcanic action. A lake near Vessleovsky Cape, at the west entrance to Captain Harbor, was by Veniaminof described as a lagoon connected with the sea, but at the present day it is separated from the latter by quite a wide strip of rocky land.

The geological formation of Oonalashka consists chiefly of granite, basalt, porphyry, and slate in alternate layers, and a few hot springs are found at various points on the island.

Three vast bays indent the shores of Oonalashka Island. One opening to the northward—Captain Harbor—is divided into two branches by the island of Amaknak, and is the site of the principal settlement of Iliuliuk. Another bay, the largest in size on the island, opens into the Pacific in a northeastern direction; this is Bobrovoi or Sea Otter Bay, nearly 30 miles in length. A narrow isthmus separates this gulf from the bay of Makushin, opening westward into Bering Sea. The whole south coast of the island is cut up into deep fiords; but as they are open to all southerly and easterly winds, they afford no anchorage for shipping, with the exception perhaps of the small bay of Kiliuliuk, whence a portage route leads across to the bay of Kashiga, debouching into Oumnak Strait. An excellent harbor opening into the same passage is the Bay of Chernovsky, near the southwestern extremity of the island.

Separated from Oonalashka by a pass only 5 miles in width is the island of Oumnak, nearly 60 miles in length but not over 10 miles wide at any point. The southern extremity of this island is low, rolling prairie land, rising gradually into a chain of mountains crowned with snow-covered summits, two of which are active volcanoes. The southernmost of these is situated a short distance northward of the present settlement. The larger and more important is the Vsevidof, which rears its head nearly in the middle of the island, just south of Inanudakh Bay. Another extinct crater is located near the north end of Oumnak Island, and bears the name of Tulik. Earthquakes and rumbling noises are of frequent occurrence here, and as late as the year 1878 a new crater, emitting steam and boiling mud, after a brief eruption of flames and ashes, appeared in the sloping plain between the southern volcano and the settlement. The whole coast of the island is beset with

rocks to such an extent that it is shunned by the navigators. The eruptions of ashes and rocks from the active craters frequently fill up the creeks and mountain streams and seriously interfere with the periodical runs of salmon and other fish. These disturbances also affect the neighboring coast of Oonalashka, and at the present day only one out of eleven populous villages noted by the early visitors is in existence. On the northeastern side of the Vsevidof crater a geyser has been observed, in which the water rises every fifteen minutes to a height of about 2 feet, the temperature being sufficient to boil meat or fish; but the steam rises out of a gravel deposit and disappears without leaving any trace of opening or funnel behind. The natives report a large number of hot springs in various portions of the island. The general formation of the mountain seems to be porphyry and granite, intersected with large masses of obsidian.

To the northward of Oumnak, at a distance of between 10 and 12 miles, lies the small rocky island of Bogoslov (St. John the Theologian). This island or crater appeared above the waters of Bering Sea within historic times. On the 18th of May, 1796, a Russian trader named Krukof found himself on the north end of Oumnak Island; the weather was thick and stormy, and there were many indications of volcanic disturbance, but on the following morning the atmosphere cleared and a column of smoke became visible some distance at sea. Toward evening a black object appeared under the smoke, and during the night large flames of such brilliancy rose up from the same point that on the island night was converted into day, and at the same time an earthquake with thundering noises shook the whole island, while rocks were occasionally thrown across the sea from the new crater. With sunrise of the third day the earthquake ceased, the flames went down, and the newly created island loomed up in the shape of a cone. A month later Krukof found the peak considerably higher, still emitting fire and ashes; later, however, the flames ceased altogether, and volcanic action was confined to the emission of steam and smoke. Four years later, in 1800, the smoke had ceased, and when eight years had elapsed since the first appearance of the island some hunters visited its shore, and at that time the sea immediately surrounding it was still warm and the rock too hot to permit of landing, but a few years later the cliffs of Bogoslov had cooled sufficiently to attract a large number of sea lions. From the time of its first appearance until 1823 successive visitors reported an increase of both height and circumference, but from that date no further elevation seems to have taken place.

The next group of islands to the westward bears the common name of Four Peaks Islands, and consists of Ouliaga, Kigalgin, Kagamil, Chuginadak, and Unaska, and a few smaller rocky islets. On nearly all these islets we find craters which are or have been active within historic times, and smoke still issues from those on Unaska, Kagamil, and Amukhta. Earthquakes are frequent, and deposits of lava, ashes, obsidian, and other volcanic products abound everywhere. But one of the islands, Chuginadak, affords an anchorage for shipping, and consequently the group is rarely visited except by sea-otter hunters. In former years many villages existed here, and in cavities of the island of Kagamil a large collection of mummies in a very good state of preservation has been discovered.

The Andreianovsky group of islands, named after its discoverer, the Russian trader Andreian Tolstykh, consists of fourteen or fifteen large islands and a number of small ones. The eastern-most of these is Siguam, nearly circular in shape, mountainous throughout, with several smoking craters, without harbors, and uninhabited. Southwest of Siguam lies the island of Amlia, extending from east to west about 30 miles, but only 2 or 3 miles in width. A long chain of conical peaks traverses the whole length of the island, but no active craters are known to exist. A few streams empty into the Pacific in the south and into Bering Sea in the north, but only one small anchorage exists on the south coast. At the time of its first discovery Amlia contained several villages, but they have long since been abandoned.

The largest of this group is the island of Atka. It resembles Oonalashka in shape, but its indentations are less deep and not so easily accessible. Near the north point of the island there is a volcano called the Korovinski, nearly 5,000 feet in height, and a few miles to the south another rises to almost the same elevation, the Kliutcheva (or Springs volcano); and the third, somewhat less in height, though also covered with eternal snow, is situated near the northeastern

extremity of the island, and was named Sarychef. A few smaller volcanoes are scattered along the gradually descending mountain range, forming the backbone of the island. The northernmost only of these craters is active at the present day, emitting smoke and ashes, but earthquakes and subterranean noises are felt and heard all over the island. The largest indentation of Atka is on the west side, in the bay of Korovinski, on the shores of which the principal settlement was formerly located. The old establishment was removed, however, to Nazan Bay, nearly opposite, on the east coast of the island. In neither of these bays was the anchorage very desirable, one being exposed to westerly and the other to easterly winds. About midway on the west coast is a sheltered harbor, Banner Bay, extending some 5 or 6 miles inland, and separated from a corresponding opening on the eastern coast by a low, narrow isthmus. The mountains in the northern part of Atka exhibit the only glacial formation known to exist on these islands west of Oonimak. Hot springs are plentiful throughout the interior, and at two or three points the natives report mud craters throwing up liquid masses varying in color from red to green, blue, and a brilliant yellow.

Of the small islands adjoining Atka in the west but little is known beyond the fact that they are mountainous, uninhabited, and evidently of volcanic origin. The nearest large island is that of Sitkhin, which is round in shape and mountainous, culminating in a snow-covered peak 5,000 feet in height, which was reported by Sarychef as emitting flames in the year 1792, but at present no volcanic action is observed beyond hot springs emerging from the rocks in many places.

To the westward of Sitkhin rises the large island of Adakh, covered with mountains and indented with several bays, of which, however, only two, Kiliuliuk Bay on the west and Shagakh on the east, afford anchorage to vessels. One grand peak rising up nearly in the center of the island was called the "white crater" by the Russians, but at present it seems to be extinct. Hot springs abound, however, throughout the mountains and valleys of the island.

The islands of Kanaga and Tanaga, in the vicinity of Adakh in the west, also exhibit a succession of volcanic peaks rising abruptly from the sea, a few of them still smoking and grumbling. Only on Tanaga Island is there an anchorage on its western shore, in the Bay of Slava Rossia.

The small island of Anangussikh, or Goreloi, is situated due west of Tanaga, and consists of one immense peak rising abruptly from the sea, with a circumference of about 18 miles. Several of the Russian explorers estimated the height of this peak greater than that of Shishaldin, or more than 9,000 feet, but no recent measurements to confirm this statement have been made.

Throughout the whole group of the Andreinovsky Islands Atka contains the only settlement, all the other islands, though once populous, now serving only as temporary hunting grounds.

The next group of islands to the westward, named by the Russians the Rat Islands, consist of a mass of small volcanic peaks, with the exception of two of somewhat larger dimensions—the islands of Amchitka and Kyshka. Hot springs are found on nearly every island of the group, but smoking craters exist only on Semiseisopochnoi, of Seven Peak Islands, and on Sitkhin; the latter being probably the westernmost active volcano of the Aleutian chain. The only anchorages to be found in this whole group are on the west coasts of Kyshka and Amchitka, respectively.

The last subdivision of the Aleutian chain was classed by the Russians as a separate group (the Near Islands), and consists of the islands of Attoo and Agatoo, the latter situated a short distance southeast of the former. The formation of these two islands seems to be very similar to those to the eastward, but no volcanic phenomena have been observed here within historic times. On the northeastern coast of Attoo the only settlement is situated on the small sheltered Bay of Chichagof, but another anchorage, called Massacre Bay, exists on the south coast. The island of Agatoo has long since been abandoned by its inhabitants, and affords no shelter to sailing craft.

THE VOLCANIC REGION OF ALASKA.

As the best authority extant on the volcanic manifestations in Alaska, I use a translation of Dr. C. Grewingk's "Treatise on the volcanic character of certain regions of the Russian possessions,"

published in the year 1850, in the Proceedings of the Mineralogical Society in St. Petersburg. Grewingk writes as follows:

We know of no more extensive theater of volcanic activity than the Aleutian Islands, the Aliaska Peninsula, and the west coast of Cook Inlet. Here we have confined within the limits of a single century all the known phenomena of this kind: The elevation of mountain chains and islands, the sinking of extensive tracts of the earth's surface, earthquakes, eruptions of lava, ashes, and mud, the hot springs, and exhalations of steam and sulphuric gases. Not only does the geological formation of most of the islands and a portion of the continent point to volcanic origin or elevation, but we have definite information of volcanic activity on 25 of the Aleutian Islands. On these islands 48 craters have been enumerated by Veniaminof and other conscientious observers; and in addition to these we have on the Aliaska Peninsula 4 volcanoes, 2 on Cook Inlet, 1 on Prince William Sound, 1 on Copper River, and 1 in the vicinity of Sitka (Mount Edgecombe); 3 other peaks situated between Edgecombe and the Copper River have not been definitely ascertained to be volcanic. The distance from the Wrangell Volcano, in the vicinity of Copper River, to the Sitkhan Island is 1,505 nautical miles. We have every reason to believe that the Near Islands (the westernmost of the Aleutian group) are also extinct craters; and thus we find one continuous chain of volcanoes, from Wrangell to the near Commander Islands (Bering and Copper), pointing to the existence of a subterranean channel of lava finding its outlet or breathing hole through the craters of this region. The nearest volcanoes to the south of this line are Mount Baker on the American continent, in latitude 48° 48′, and the craters of the Kurile chain of islands on the coast of Asia. That a subterranean connection exists between this long line of craters is indicated by the fact that whenever volcanic activity grows slack in one section of the chain it increases in violence at some other point, an observation which has been confirmed by all observers. From all information on the subject at our disposal it appears that the craters of Mounts Fairweather, Cryllon, and Edgecombe, and Mount Calder (Prince of Wales Island) have not been active since the middle of the last century, and as the universal law of volcanic activity seems to place the frequency of eruptions in an inverse ratio to the height of the volcanoes, we might reasonably expect that the season of rest for these craters will be a prolonged one; but how terrible and devastating must be the awakening of the sleeping furnaces when it occurs! With regard to Mount St. Elias, we have many authentic data as to its volcanic nature. Belcher and Wrangell consider that the black ridges descending from the summits of the mountains, and the fact that the glaciers on Copper River exhibit a covering of vegetation, as proof of the volcanic character of the mountain. The first phenomenon may rest entirely upon an optical delusion, as it is not at all certain that the black streaks consist of lava or ashes, while the appearance of vegetation on the surface of glaciers on Copper River is very probably due to the fall of volcanic ashes; the latter phenomenon may be traced as easily and with far more probability to the Wrangell Volcano.

With a feeling of relief we abandon this field of speculation and enter upon a review of the volcanic phenomena of these regions in geographical as well as chronological order. All the editions upon which our list is founded came from the reports of the accidental visits of European travelers and explorers. Owing to the low grade of civilization of the natives, and even of the colonists, it has been exceedingly difficult to collect the necessary information from inhabitants of the country; but such as it is, I have made use of all material accessible to me. We first review the volcanic manifestations, as far as known, in geographical order.

On Prince of Wales Island, Mount Calder, located in latitude 56° 15′ and longitude 133° 30′, was active (?) in the year 1775, according to Don Antonio Maurelle; not active in 1793, according to Vancouver, and reported in the same condition by all later observers. On Baranof Island we have hot springs, situated in latitude 56° 51′ and longitude 135° 19′, which were reported flowing by Baranof in 1779, and have remained in the same condition. On the mainland we have Mount Cryllon, in latitude 58° 45′ and longitude 137°, reported not active by Cook in 1778. Mount Fairweather, in latitude 59°, longitude 137° 30′, reported not active by La Pérouse in the years 1786 to 1788; Mount St. Elias, in latitude 60° 17′, longitude 140° 51′, reported not active by Vancouver in 1794, and continued in the same condition. The coast crater on Prince William Sound (?), in latitude 60° 54′, reported in eruption by Don Fidalgo; Mount Wrangell, in latitude 62° and longitude 142°, discovered in 1819, and reported active by Kliwosky and Wrangell. The high peak or Rédoute Mountain, latitude 60° 30′, longitude 152° 145′ (west coast of Cook Inlet), reported smoking since 1819 by Wrangell and others. Mount Ilyamna, latitude 60°, longitude 153° 15′, reported not active by Bering in 1741 (?) and active by Cook in 1778; also by Don Artsaga in 1779; also in 1768 by Portlock and Dixon; and in 1793 by Vancouver, and also by all later observers, and still continues the same. On the Aliaska Peninsula the Veniaminof crater, latitude 56°, longitude 158°, reported smoking by Veniaminof from 1830 to 1840; hot springs, in the same vicinity, reported flowing by Veniaminof at the same time, and continue in the same condition; Pavlovsky crater, in latitude 55° 24′ and longitude 161° 48′, reported active from 1762 to 1768 by the promyshleniks; according to Chamisso one of its craters became extinct in 1786, reported active by Sarychef in 1790, also by all later observers, and is still smoking. The craters of Medvednikof and Morshova, in latitude 55° and longitude 162° 37′, reported not active in 1768 and 1769 by Krenitzin, but active in 1790 by Sarychef, now smoking occasionally; hot springs at the entrance of Morshova Bay, in latitude 54° 34′ and longitude 152° 25′, were reported flowing in 1832 by Lütke. Hot springs, on the peninsula, in latitude 55°, longitude 163° 10′, were reported by Veniaminof as flowing in 1838; hot springs, on Moller Bay, latitude 55° 45′, longitude 160° 30′, were reported flowing in 1828 by Lütke and in 1840 by Veniaminof, and still continue in the same condition. The volcanic island of Amnak, latitude 55° 26′, longitude 163° 15′, was active during the last century, but not active since 1804, according to Krusenstern. On Oonimak Island the volcano Khaginak, in latitude (?), has not been active within historic times, though Veniaminof, from native accounts, computed that its crater was formed in the year 1690.

Of the two other volcanoes on this island, Shishaldin, in latitude 54° 45′, longitude 164°, and Pogromny, latitude 54° 30′ and longitude 164° 45′, we have the following data:

In the years 1775 to 1778 the Shishaldin was reported as occasionally active by Zaïkof; in 1778 Shishaldin was reported smoking by Cook, and in 1790 by Sauer; it was also reported smoking in 1824 by Veniaminof, and as in full eruption in 1825; in 1826 a new eruption was reported by Veniaminof and also increased activity from 1827 to 1829, and from 1830 to 1831. Pogromny had its greatest activity in the year 1795, and another violent eruption in 1827, and in the autumn of 1830; both are still smoking.

In the Island of Akoon a crater, situated in latitude 54° 17′, longitude 165° 33′, was reported by the promyshleniks as not active between 1765 and 1770; in the year 1828 Veniaminof reported it smoking. Hot springs were reported flowing in 1828, and still continue in the same condition. The crater on Akutan Island, latitude 50°, longitude 165° 54′, was reported not active in 1778 by Cook, and also by Shelikhof in 1785; it was reported smoking by Sauer and Sarychef in 1790; also by Veniaminof and later observers. On Oonalashka Island the Makushin crater, in latitude 53° 52′, longitude 166° 48′, was reported active by Krenitzin in 1768, not active by Cook in 1778, extinct by Sauer in 1790 and 1792, smoking by Sarychef in the same year. In 1802 an eruption, accompanied with earthquake, was reported by Langsdorff; in 1816 and 1817 Eschholz reported it as not active; in 1780 Veniaminof reports earthquakes, and in 1826 an eruption; later observers reported it still smoking. On Oumnak Island the promyshleniks reported no volcanic phenomena between 1765 and 1770; in 1784 the Vsevidof crater was still smoking; in 1790 it was reported smoking by Sarychef. From 1817 to 1820 violent eruptions and earthquakes took place throughout the whole Oumnak range. In 1824 and in 1830 other eruptions were reported by Lütke and Postels. The volcanic island of Bogoslov rose from the sea in 1796 with earthquake and eruptions; reported as not smoking in 1800 by Kotzebue; also in 1802 by Langsdorff; reported smoking in 1804 by Kotzebue; in eruption in 1806 by Langsdorff; throwing up stones in 1814 by Baranof; decreasing in height in 1815, also by Baranof; not active in 1816 and 1817, according to Eschholz, and smoking again in 1820, according to Dr. Stein; reported by Veniaminof as no longer smoking since 1823. The volcano on Kagamil Island, in latitude 52° 53′, longitude 169° 30′, was reported to have been active by Lütke and Postels. In 1828 Veniaminof reported only hot springs, an exhalation of gases, and subterranean noises. On the island of Tanaga, in latitude 53°, longitude 169° 45′, the volcano is reported not active by Bragin in 1774; in 1828 Lütke reported it active, with many hot springs at its base. The volcanoes of Ouliagan and Chegulakh, in latitude 52° 53′ and longitude 169° 40′, and latitude 53° 08′, longitude 169° 24′, respectively, have not been active since the end of the eighteenth century. The volcano of Unaska, latitude 52° 40′, longitude 170° 28′, was reported smoking in April, 1817, by Choris; in eruption in 1824 by Lütke, and in 1830 by Veniaminof. The volcano of Amukhta, in latitude 52° 30′, longitude 171° 04′, reported in full eruption in June, 1786, by Shelikhof, and in 1790 by Sarychef; in 1830 it was reported not active by Lütke, but smoking by later observers. The volcano of Siguam, in latitude 52° 20′, longitude 172° 12′, with mud craters and hot springs, was reported active by Sarychef in 1790, and smoking by Lütke in 1827; also by later observers. The five craters on the island of Atkha were reported active from time to time since 1760 by Zaïkof, Tolstykh, Lütke, and others. The Sarychef crater was considered extinct since 1792, but broke out again in 1812, according to Vassiler. The Korovinsky crater was in eruption and smoking in 1829 and 1830. The Konik peak was reported smoking in 1827 by Lütke; in 1829 by Ingenström; also by later observers.

The volcano on Sitkhan Island, latitude 52° 04′, longitude 167° 02′, was reported not active by Tolstykh in 1760, in eruption by Sarychel in 1792, covered with snow and smoking by Ingenström in 1829, also by later observers. The White volcano on Adakh, in latitude 50° 45′, longitude 176° 30′, was reported active in 1760 by Tolstykh; also in 1784 by Shelikhof; and in 1790 and 1791 by Sauer and Sarychef. The volcano of Kanaga, latitude 52°, longitude 176° 50′, was reported active, with many hot springs at its base, by Tolstykh in 1763, also by Shelikhof in 1768; smoking in 1790 and 1791 by Sarychef, and in 1827 by Lütke, and by later observers. The crater on Tanaga, in latitude 52°, longitude 178°, was reported active from 1763 to 1770 by promyshleniks, and smoking by Sauer in 1791, and by later observers. The volcano on Goreloi, latitude 51° 43′, longitude 78° 45′, was reported active in 1760 by Zaïkof, in eruption by Sarychef in 1792, smoking by Ingenström in 1829. The volcano of Semiseisopochnoi, latitude 52°, longitude 180° 15′, reported smoking in 1772 by Bragin; also by Sarychef in 1790 and 1792; by Lütke in 1830, and by later observers. The volcano of Sitignak, latitude 51° 39′, longitude 181° 33′, was reported active by Bragin in 1776; and finally the crater of Sitkhan, in latitude 52° and longitude 181° 30′, reported smoking by Lütke in 1828.

CHRONOLOGICAL REVIEW OF VOLCANIC PHENOMENA ON THE ALEUTIAN ISLANDS AND THE NORTHWEST COAST OF AMERICA FROM THE YEAR 1690.

Formation of the crater on the highest peak of Oonimak Island east of the Shishaldin, probably the Khaginak.

1700 to 1710.—Volcanic activity on the Ouliagan, Chegulakh, and Amnak.

1741.—Iyiamna mountain not active (?).

1760.—Adakh, Goreloi, Chechina, and Atkha smoking; Koniushy Island rising.

1762.—Pavlovsky volcano, on Aliaska Peninsula, active.

1763.—Volcano on Tanaga active (until 1770).

1768.—The Makushin and another volcano on Oonalashka active; also the Medvednikof and Morshova, on the peninsula.

1770.—Amukhton active.

1772.—Semiseisopochnoi smoking.

1774.—The volcano on Tannakh-Angunakh active.

1775.—Mount Calder and other peaks on Prince of Wales Island active; also one crater on Oonimak Island intermittent.

1776.—The volcano on Sitignak in eruption.

1778.—Ilyamna volcano active, and Shishaldin smoking.

1784.—Vsevidof, on Oumnak Island, smoking; also the Chechina.

1786.—The volcano on Kanaga in eruption; Pavlovsky crater active; Siguam and Amukhta active, the former until 1790, the latter until 1791.

1788.—No volcanic phenomena reported, but on 27th of July a flood submerged the islands of Sannakh and Ounga and a portion of the peninsula (evidently a tidal wave owing to earthquake).

1790.—Akutan peak smoking; also Vsevidof, on Oumnak, the Kanaga, and Semiseisopochnoi. The Makushin, on Unalaska, active from 1790 to 1792; and the Shishaldin from 1790 to 1825 (intermittent). Eruption reported on Prince William Sound, in latitude 60° 54′(?).

1791.—The peaks of Tanaga and Kanaga smoking.

1792.—The peaks of Sitkhin and Goreloi in eruption in May; Semiseisopochnoi smoking in June.

1795.—Eruptions in southwest end of Oonimak, while a crater on the north side becomes extinct.

1796.—Appearance of Bogoslov Island; Edgecombe active(?).

1796 to 1800.—Craters on the Four Peak Islands active; also Amnak Island.

1800 to 1815.—Bogoslov rising, but not smoking.

1802.—Makushin in violent eruption—earthquakes. Bogoslov not active.

1812.—Sarychef Peak, on Atkha, very active after a long repose.

1817.—An eruption on the north end of Oumnak, with a flow of ashes and earthquake; Unaska smoking.

1818.—Makushin, on Oonalashka, shaking; subterranean disturbances on Amnak.

1819.—Mount Wrangell in eruption; the Rédoute volcano smoking.

1820.—Bogoslov smoking.

1824.—Shishaldin in violent eruption from 1824 to 1825; Unaska in violent eruption after a long repose.

1825.—Eruptions on the northeast side of Oonimak.

1826.—Eruptions and fall of ashes on the south end of Oonimak; the Makushin, on Unalaska, smoking and shaking.

1827.—The Shishaldin and the Pogromny, on Oonimak, in eruption from 1827 to 1829. The peaks on Koniushy and Kanaga smoking. In June, earthquake on Copper Island.

1828.—The peaks of Sitkhin, Akoon, Akutan, Tannakh-Angunakh, Atkha, Koniushy, Goreloi, on Oonimak, smoking.

1829.—Shishaldin smoking; also Sitkhin; Goreloi, Tanaga, Kanaga, and Atkha smoking.

1830 to 1831.—Shishaldin in violent eruption; also an eruption on southwest end of Oumnak and on Unaska; the Korovinsky, on Atkha Island, smoking.

1836.—Earthquake on islands of St. Paul and St. George.

1838.—Shishaldin in eruption, and three other peaks on Oonimak Island smoking; the Tannakh-Augunakh, the Makushin, on Oonalashka, the Akutan, the Pavlovsky crater, and another peak on Aliaska Peninsula, smoking.

1844.—The Korovinsky crater, on Atkha, and the Makushin smoking.

From this review, however incomplete, it would appear that the volcanic activity of the Aleutian Islands and the Aliaska Peninsula has been decreasing since the discovery of those regions by the Russians. When we consider the three classes of manifestations of volcanic activity—that is, eruption, the reduction of sulphuric deposits, and total inactivity—and apply them to the islands mentioned, we find that in the year 1830 twelve of the islands produced sulphuric deposits, eight islands were in a state of total inactivity, and five (Unaska, Tannakh-Angunakh, Oumnak, Oonalashka, and Oonimak) were in a state of perceptible, though not always violent, uninterrupted activity.

It is also clear to the observer that certain relations exist between the alternate repose and activity at various points along the northern volcanic belt now under consideration. According to the earliest accounts of Tolstykh, Bragin, Zaĭkhof, Shelikhof, Cook, Sauer, Vancouver, and others, the islands of Sitignak, Kanaga, Amukhta, Bigamil, Bogoslov, Oonalashka, Oonimak, and the volcanoes of the peninsula and the Ilyamna were from the middle to the end of the last century in a state of alternate but generally decreasing activity, while the center of volcanic action apparently advanced from west to east. On Kamchatka, where from 1727 to 1731 the Kluchev was in constant eruption, and in 1737 and 1739 violent eruptions took place from the Avatcha and another volcanic peak, we find only two violent eruptions during the second half of the eighteenth century (of the Kluchev in 1762 and 1767, and of the Avatcha in 1773 and 1796). In 1820 the furnaces of Unaska, Oumnak, and Oonimak evinced renewed activity, while at the same time Mount Wrangell was in eruption. When, however, after this period, the volcanic manifestations on these islands began to decrease, the Kamchatka peaks once more opened their craters with increased violence in the years 1827 and 1829. Of late (1849) we have received no reports of volcanic phenomena on the Aleutian Islands, but the Kamchatka craters are once more in eruption since 1848.

These data, vague as they are, do not furnish proof positive of a connection between these subterranean channels, but the fact that within a more limited area, as on the islands of Oumnak, Oonalashka, and Oonimak, the activity of one crater ceased when another was in eruption, points in the same direction.

The Aleutian chain of islands connects the American continent and the Alaska peninsula in the east and the Commander Islands in the west as with a knotted cable that has sunk under its own weight and caused its supports or end posts to converge on both the Kamchatkan and American coasts. Several ranges of mountains run at right angles with this chain or dam. When we look at the outward shape of the islands we find those in the west spreading and flattening toward the north and northwest, and those in the east spreading to the west and south; consequently the lifting force must have been strongest in the direction from southwest to northeast, and this has been the direction of nearly all the earthquakes within historic times.

It seems that three kinds of volcanoes are represented in the Aleutian chain: Eruptive, or true volcanoes; intermittent, or partially eruptive volcanoes, and volcanoes that have risen and acquired elevation without an outbreak through the surface. All the volcanoes, with the exception of Shishaldin, have their summits covered with eternal snow. The location of craters on these peaks is as follows: On Shishaldin the crater is located on the summit of the cone; that of Khaginak is on the summit; that of Akoon is also on the summit; on Akutan volcano the old crater was at the summit, and another off later date is situated on the north slope of the peak; the crater of Makushin is located at the summit of the blunted cone; the crater of Vsevidof, on Oonimak Island, is on its comb-like summit; the crater of Chegulakh is at the summit of the cone, and that of Unaska is also on the summit of the blunted cone; the Korovinsky volcano has its crater in a depression between two peaks; the volcanoes of Kanaga and Tanaga have their craters at the summit, while that of Sitkhin is located on one side of the conical peak.

A majority of the volcanoes mentioned have their craters at the summit, and should consequently be true volcanoes, but we are by no means sure that all the apertures from which smoke issues are actual craters affording constant communication between the entrails of the earth and the external atmosphere. On many of the island volcanoes the appearance of smoke is due to hot springs or steam arising from cracks or clefts differing very essentially from actual volcanic craters. Where the smoking or steaming is periodical, and increasing in volume during the autumn of the year, we may presume that the constant communication with the volcanic earth beneath exists, since the voluminous atmospheric precipitation at that season of the year would penetrate to the heated strata of the earth and rise as steam from the furnace or crater.

The eruptions reported by the various observers must also be accepted with due caution; in many instances they consisted probably of ignited gases only, as several such eruptions have been described as taking place for prolonged periods on the summits covered with eternal snow. Occasionally the appearance of fire may be traced to the mere reflection of the glow of molten lava in the interior of the crater on the clouds and vaporous atmosphere above. It is true that lava, obsidian, and pumice stone are found at various points of the Aleutian Islands, but we have no descriptions of streams of burning lava, a phenomenon which could not have failed to impress itself upon the mind of even the most careless observer. A few eruptions that have occurred within historic times consisted of ashes, stones, and liquid mud, and they seldom took place in the main craters, being apparently of a subordinate and spasmodic character. We know that sulphur is gathered from many of the craters, but the crystallization of sulphuric gas is among the weakest manifestations of volcanic activity. A majority of the Aleutian volcanoes belong to this class of sulphur-producing clefts and craters.

The falling in of mountains rising on the east coast of Bering Sea, the apparent swelling and bursting of whole sections of islands—all these are indications pointing to a constant process of formation of peaks, craters, and crevices by elevation. A gradual rising is still observable on Oonimak Island and the north coast of Aliaska Peninsula. Bering Sea at its western end has a uniform depth of a hundred fathoms or more, while the eastern half is very shallow. Another point in favor of the theory that this region owes its origin more to gradual elevation than to violent eruption lies in the fact that the island of Bogoslov was not the result of eruption and piling up of débris or lava, as the island rose very slowly, and its crater was active but a very brief period of time; the elevation continued long years after all other volcanic manifestations had ceased. The only islands actually formed by accumulations of lava during eruptions in Bering Sea are St. Matthew, St. Michael, and Stuart islands, the Pribylof group, and perhaps Amnak Island.

Historical Sketch of Alaska.

A report upon a country so little known to us as Alaska is at the present day would scarcely be considered complete without a brief historical sketch of its first discovery and subsequent development until its final fusion into the Union of States and Territories. For this purpose it is unnecessary to go back beyond the second voyage of discovery undertaken by Vitus Bering, who, in the course of his first explorations, some years previously, had discovered the strait named after him, and proved to the world the separation of the continents of Asia and America. The so-called second northern naval expedition, fitted out in the year 1733 by order of the Empress Anna, though unfortunate in nearly all its details and fatal to its commander, served to show the Russian navigators the way to unknown regions of North America and adjoining islands. The information brought back by members of the expedition, however vague and unsatisfactory, acquainted the Russians with some islands the existence of which had been exceedingly doubtful. The labors of this expedition resulted in the discovery of the North American coast in the vicinity

of latitude 58°, and of the several islands of the Aleutian chain, as well as of the greater portion of the Kurile Islands. A few of the latter had been reported as early as the end of the sixteenth century, but for more definite information as to these localities the world was indebted to the Russian traders and hunters or other adventurers, who, upon a mere rumor of the existence of valuable furs, set out in such craft as they could lay their hands upon and made their way from island to island until the whole region was discovered.

Up to the year 1743 we have no account of any expedition in search of furs in this direction, but from that time for a period of nearly 60 years merchants and other individuals fitted out vessels and even squadrons of small craft, either individually or in company with others, for hunting and trading on the Aleutian and Kurile islands. Much of the information and reports brought back by these adventurers is supported by documents still in existence. These enterprises were exceedingly numerous, but for our purpose it is necessary only to mention briefly those that accomplished any new discoveries in the direction of the American coast.

The first to engage in this traffic was a sergeant of the Cossacks of lower Kamchatka, Emelian Bassof, who sailed in a small vessel of his own construction to the islands of Bering and Copper in four consecutive voyages in the years 1743, 1745, 1747, and 1749. The next adventurer to imitate Bassof's example was a sailor named Nevodchikof, who had served under Bering, and who sailed as commander of a vessel fitted out by the merchants Chuprof & Co., in the year 1745, reaching the islands of Attoo and Agatoo. In the year 1749 a small vessel, built and fitted out by the merchant Trapeznikof, succeeded in reaching the island of Atkha and a few of the smaller surrounding islands. In the year 1759 the trader Glottof, with a ship belonging to the merchant Nikiforof, advanced as far as the island of Oumnak, and subsequently discovered the whole group of islands, including Unalaska, which was subsequently named the Fox Islands. The discovery of this group has also been ascribed to a navigator of another expedition, Bashmakof, but as Bashmakof accomplished his voyage nearly 10 years earlier, and as there is positive proof that no fox skins were shipped to Kamchatka from the Aleutian Islands previous to the year 1762, his claim to the honor of this discovery becomes very doubtful. The inhabitants of the islands also preserve a tradition that Glottof was the first Russian who came among them, and that he baptized many of the natives. Glottof was also the first to furnish a map of that region to his Government, which map contained eight large islands situated east of Oonalashka.

In the year 1760 the merchant Andreian Tolstykh landed upon the island of Adakh, and in the course of a sojourn of three years accomplished a thorough exploration of that island and seven others surrounding it, and made a detailed report to the Government, stating that he had subjected the people to the Russian Crown. These islands were named, after him, the "Andreian Islands." The result of his reports to the Russian Government may be gleaned from the following ukase of the Empress Catherine II to the governor of Siberia, Chicherin, dated March 2, 1766:

DENIS IVANOVICH:

Your information concerning the discovery and subjection of six Aleutian islands heretofore unknown, as well as the copy of the report of the Cossack Vassiutin, I have read with the greatest satisfaction. These enterprises are exceedingly pleasing to me. I am only sorry that there is no detailed description of the country and the people.

Your action in promising rewards to the merchant Tolstykh, and special privileges for any future undertakings of the same kind, under condition that a tribute of a tenth part of the result be paid to the Crown, I fully approve; and you may tell him that he may proceed in accordance with this proposition. Him, as well as the Cossacks Vassiutin and Lazarev, you will promote into the class of Siberian nobles.

God grant that the proposed voyage may be a fortunate one, and crowned with success. I should like very much to learn whether any information can be gleaned from the natives of those islands of any previous visit of Europeans to their country, and if there has been no wreck of vessels of any other nation. You must urge upon these promyshleniks to treat the natives with kindness and to avoid all oppression or ill treatment of their new brothers.

To this ukase was affixed the Empress's own signature.

In the year 1761 a ship of the merchant Bechevin made the coast of the Aliaska Peninsula. Up to this time the relations between the natives of the islands and the Russian invaders had been altogether of a friendly character, the former submitting patiently to the demands of the newcomers, but the promyshleniks, encouraged by their easy conquests, proceeded from bad to

worse, committing outrages of every kind, reducing the people to a state of servitude verging upon absolute slavery, and continued to act in this manner until the patience of even this timid race was exhausted.

The first Russians to feel the effect of a change in the attitude of the natives were the members of an expedition under command of the merchant Drushinnin, who arrived at Oonalashka in 1762. Upon a given signal the people of all the villages on the island rose and slaughtered their oppressors, until of a complement of over 150 men only 4 individuals, who happened to be absent from their vessels, survived; these were subsequently saved through the good offices of a charitable Aleut, who kept them in concealment in the interior of the island until it was possible to communicate with the members of another expedition.

In the meantime the governor of Siberia, in answer to his instructions to furnish more detailed information concerning the new discovery, represented to the Empress that it was impossible to accomplish this as long as the new discoveries were visited only by ignorant traders, incapable of making any astronomical observations or scientific inquiries. The governor requested that some naval officers be detailed to make the desired explorations. The Empress referred the matter to the admiralty college, and after some correspondence two captains of the navy, Krenitzin and Levashef, were selected to execute the will of the Empress. After many mishaps these two officers succeeded in sailing from Kamchatka in two Government vessels in the year 1768. Krenitzin, who was senior in command, advanced as far as the strait between the Aliaska Peninsula and the island of Oonimak, and went into winter quarters, while his companion, Levashef, established himself with his crew in Captain Harbor, Oonalashka Island. Krenitzin had some difficulties with the natives, resulting in several skirmishes, and both commands suffered terribly from the scurvy during the whole winter, disease and other misfortunes preventing them from doing much in the way of scientific observation, and in the following year they returned to Siberia with only one-third of the crew, the remainder having fallen victims to the scurvy or been killed by the warlike natives of the mainland.

The first visit to the island of Kadiak, made by Glottof, was also attended with disaster. He reached that island in the autumn of 1762, and went into winter quarters with his crew at the southeastern extremity of the island, in the neighborhood of the present settlement of Kaguiak. After several hostile attacks, which were repulsed by the Russians, the natives kept aloof, refusing to trade, but when, in the course of the winter, scurvy appeared among the invaders, reducing their strength to less than one-third, the savages again made attempts to complete the work of the dread disease by killing the survivors, and it was only with the greatest difficulty that Glottof succeeded, late in the following spring, in launching his vessel and making his escape to Oumnak.

The history of the Russian discoveries for the next twenty years is a continuous story of outrages committed by the numerous trading expeditions, and of internal quarrels between themselves. The success of the earliest adventurers had been so great that every Siberian merchant who had a few thousand rubles at his command sought to associate himself with a few others, in order to fit out a miserable craft or two and engage in the same business, and over sixty distinct enterprises of the kind can be traced. They all carried on their operations on the same basis; that is, the owner or owners of the vessel engaged a crew on shares, the cargo of furs brought back by each vessel being divided into two equal shares; one of these was claimed by the owners who had furnished the means, and the other half was divided in such a manner as to give each member of the crew one share, and to the navigator and commander two each. After the division had been made each participant was obliged to give one-tenth of his share to the Government. These so-called traders had managed to do their business with an exceedingly small stock of goods. Where no opposition was offered by the natives the invaders did not even pretend to buy skins of them, but forced them to go out and hunt and turn over their booty to the promyshleniks, without payment beyond a few beads and a leaf or two of tobacco given as a gratuity in consideration of good behavior; and the unfortunate natives were given to understand that as subjects of the Russian Empire it was their duty to render such services in behalf of the Crown.

The beginning of the eighth decade of the eighteenth century forms an epoch in the history of the Russian fur trade on the islands of Bering Sea. For several years previous to this period the most prominent merchant in Siberia engaged in this trade was Grigor Ivanovitch Shelikhof, a citizen of the town of Rylsk, who had come to Siberia, together with Ivan Larionovich Golikof, a merchant of the city of Kursk. For some time Shelikhof was engaged in business, in company with the latter and a few other Siberian traders, fitting out hunting expeditions to the Kurile and Aleutian islands, the result of which forced upon him the conviction that the yield of furs was growing less from year to year. The evident decrease in furs, together with the hostile attitude of the natives, provoked altogether by the inhuman treatment received at the hands of their visitors, called for some fundamental reform in the manner of doing business and the mode of treatment of the natives, in order to achieve a revival of trade. Fully aware of the necessity that the new discoveries should be connected with the mother country by closer ties, Shelikhof made up his mind to visit in person the distant regions, in order to discover the best means for the accomplishment of his ends, and for this purpose he persuaded his partner Golikof, together with another Golikof, Mikhail Sergeievich, who was called a captain, to form a new company for a period of ten years. The paid-up capital of the new firm was limited to 70,000 rubles, divided into 120 shares, and with this capital it was proposed to construct two or three ships and dispatch them on a sea voyage under the personal supervision of Shelikhof; or, according to the wording of the mutual agreement by the partners, "to sail for Aliaska land, called America, and for known and unknown islands, to carry on the fur trade and explorations, and to establish friendly intercourse with the natives."

Having fitted out at Okhotsk three galliots, named respectively the Three Saints, the Archangel Michael, and the Simeon the Friend of God and Anna the Prophetess, Shelikhof sailed with them on the 16th of August, 1783, taking passage with his wife on the first of these vessels. Bad weather and contrary winds caused the vessels of the expedition to separate, and after losing sight of the second-named vessel the commander concluded to winter on Bering Island. After visiting during the following year the island of Oonalashka, and repairing his vessels as far as possible, Shelikhof sailed with interpreters and 10 Aleutians, who voluntarily joined his expedition, for the island of Kadiak, leaving orders for the commander of the missing vessel to follow him to the same place. On the 3d of August, 1784, the two vessels reached the island and entered a harbor, which they named after the ship Three Saints.

Several bidarkas were sent out to discover whether the island was inhabited, and in the course of the day they brought back one of the natives, whom Shelikhof treated with great kindness, making him presents, and sent him home the next day. It was evident that the savage liked the reception given him by the Russians, as he reappeared the following day and refused to leave Shelikhof again until his final departure from the island. He not only accompanied him and served him in all his voyages about the island, but he frequently warned him of the hostile intentions of his countrymen. This hostile disposition soon became apparent. A party of men sent out in boats to hunt and to explore the island discovered a multitude of natives assembled on a precipitous, rocky island a short distance from the coast. Shelikhof gives the number of these as 4,000, an evident exaggeration. Thinking that such an assemblage could not be without some special object, Shelikhof resolved to send to the island a deputation to invite the natives to trade with the Russians and to live at peace with them, but the only answer made by the savages was a threatening demand that the navigators should immediately leave the island and never dare to approach it again. Upon this reply Shelikhof himself proceeded to the spot and endeavored to persuade the savages to assume friendly relations with himself and his men, declaring that he had come with no hostile intention, but was actuated by a sincere wish to benefit the people of the country. His words, as they were explained to the natives by the interpreters, had no visible effect, and a few arrows were discharged from the multitude, causing the boats to retreat to the ships. Measures were taken at once for defense in case of sudden attack. A few days later, in the middle of the night, the savages approached the harbor unobserved and threw themselves upon the Russians. The battle lasted until daylight with great slaughter on both sides, for the necessity for self-preservation caused the promyshleniks to fight with extraordinary bravery,

and at last the enemy, though vastly superior in numbers, was put to flight. The first victory did not by any means avert all danger, as it was reported by one of the natives who had come over to the side of the Russians that the savages were only waiting for considerable reenforcements from a neighboring tribe, and were fully resolved to renew the attack upon the intruders and to exterminate them to the last man. Under such circumstances Shelikhof resolved at once to attack the main stronghold of the enemy on the rocky island. With a picked crew of promyshleniks he attacked the savages in a position deemed by them impregnable, and after a few discharges from his iron 2-pounders stormed the place with such impetuosity that the enemy became completely demoralized, jumping over the precipices into the sea, and surrendering in large numbers to the Russians. The victory was achieved at great sacrifice in killed and wounded on the part of the Russians. The prisoners taken were located at a distance of 50 versts from the harbor and furnished by Shelikhof with provisions and hunting gear. In order to secure their allegiance twenty children of the most prominent among the captives were taken as hostages on board the ships. Occasional attacks were made after this upon hunting parties at a great distance from Shelikhof's headquarters, but the invaders had attained such a moral supremacy over the people that no further combined or organized opposition was offered.

As soon as Shelikhof found himself relieved from anxiety concerning the safety of his small command he began the organization of his colony and a systematic exploration of the surrounding regions. He dispatched one expedition in 4 large bidars, carrying 52 Russians and 11 natives of the Aleutian Islands, and accompanied by 110 natives of Kadiak, each in his own canoe. The command proceeded along the northern side of Kadiak Island, and crossing the strait dividing the island from the Aliaska Peninsula (subsequently named after Shelikhof), explored the coast of the mainland to the northward as far as the mountainous coast of Cook Inlet, inhabited by a different race. The expedition met with no opposition, which was probably due to its numerical strength more than to an actual liking of the natives for their visitors. A few hostages were brought back to Shelikhof's headquarters, but the trade carried on in the course of this exploration was of insignificant proportions. This large party on its return was located at Karluk, on the western side of Kadiak, and from here the hunters ranged north and south throughout the winter in active pursuit of the sea-otter. The promyshleniks remaining under Shelikhof's immediate command also made explorations of the island in various directions, taking hostages from every village and establishing trade among the natives. One small party advanced as far as Shuyak, the northernmost island of the Kadiak Archipelago, where friendly relations were established with the native chief; the latter succeeded in gaining the fullest confidence of the Russian leader, and was furnished with quite a large quantity of goods for trade, with the understanding that he was to act as Shelikhof's agent. The selection was an unfortunate one, as the chief not only retained the goods for his own use, but killed the men who were sent to look after the business, and then formed an alliance with the Kenaitze, on Cook Inlet, who sent him a force of nearly a thousand men to join in a combined attack on Shelikhof's fortifications. When this news was received at Three Saints Bay, at the beginning of 1786, Shelikhof at once dispatched two parties to meet the enemy, one consisting of promyshleniks alone, and the other of friendly natives of Kadiak and Aleutians. They were instructed to disperse the approaching enemy and to establish a fortification on the island of Afognak, adjoining Kadiak. At the end of the season reports arrived from the north to the effect that the objects of the expedition had been accomplished, and that a lodgment had been effected not only on Afognak, but on the coast of Cook Inlet, after severe chastisement of the hostile Kenaitze inhabiting that region.

Another exploring party was sent to Prince William Sound, with orders to proceed as far as Cape St. Elias, located by Bering in his second voyage, now known to be the southern end of the island of Kaiak. As a business venture this last enterprise was not very successful, the inhabitants of Prince William Sound and the Copper River delta showing decided aversion to intercourse with the Russians; and apparently the only result of the enterprise was the erection of crosses and various other signs at different points of the islands and seacoast for the purpose of notifying explorers of other nations that the coast had been taken possession of by the Russians. Both Spanish and English vessels had been in the same vicinity many years previous, and had taken

formal possession, leaving the usual mark of notification. All these were carefully removed by the Russian before planting their own. The same geographical farce was enacted again at the time of Vancouver's cruise in the waters of Prince William Sound, when, on several occasions, the English discoverer took formal possession of one side of an island when the Spaniard erected his crosses on the other side, and at the same time the Russians, already permanently established, moved quickly about from place to place in their light, skin-covered boats, removing the marks of possession as fast as planted and substituting their own.

At his headquarters in Three Saints Bay, Shelikhof labored faithfully to enlighten his captives and hostages and to convert them to the Greek Catholic faith. His arguments were of a practical nature; he showed them the advantages of living according to the customs of Christianity and civilization, and the poor miserable savages were only too glad to be allowed to partake of such rude comforts as the Russian traders could boast, and in return for these advantages were always willing to go through any ceremony Shelikhof chose to perform. Nearly all the captives and many of the visitors from the neighboring tribes and villages were baptized and duly counted as members of the orthodox church, and at the same time a school was established for children and adults, in which the pupils were instructed in a few rudiments of education.

Shelikhof, according to his own account, took particular care to tell these people the most marvelous stories concerning the goodness, power, and benevolence of the Empress of Russia, representing it as the highest privilege to be one of her subjects. He had with him some wretched portraits of the imperial family, and as these were the first examples of the painter's art ever beheld by the natives, they made considerable impression upon their minds. Shelikhof's wife also did her part in the work of civilization, instructing the girls and the women in needlework and such household arts as could be of any use to the savages.

In the month of May, 1786, the ship *Three Saints* had been repaired and fitted for the return voyage, and having convinced himself that all that could be effected in establishing and fortifying his headquarters in the newly-discovered district had been done, Shelikhof resolved to take his departure, in order to obtain more private means as well as Government assistance and sanction for his enterprise. He sailed on the 22d of May, and just as his ship was leaving the coast the long-lost sister ship *St. Michael* appeared in the distance. It appeared from the commander's report that this unfortunate vessel had been nearly three years making her passage from Kamchatka to Kadiah, a distance of about 1,000 miles. After promptly relieving the incapable commander Shelikhof ordered the ship to assist in an organized exploration of the coast in company with the remaining vessel of the fleet; one of the vessels to visit the northern coast of the peninsula and proceed thence northward as far as Bering Strait, while the other was to survey the coast from Kadiak eastward.

Shelikhof himself arrived at Kamchatka on the 8th of August and proceeded at once to Okhotsk, reaching that port in January, 1787. He had taken from the islands 30 natives, who subsequently accompanied him to Irkutsk. He at once submitted to the governor-general of eastern Siberia a detailed report of his discoveries, with charts of the islands and plans of the fortifications and stations established, asking for instructions for the future conduct of the enterprise; and he made the bold statement that by his labors 50,000 subjects had been added to the Russian Empire, ready to do homage to the Empress and to accept the Christian faith. If he had divided this number by ten he would have been nearer the truth. He stated to the governor-general that without the approval of the Empress his labor would be in vain, as he had acted with the sole purpose of doing his humble share in the extension and aggrandizement of his country and in securing the discoveries made by Russians against the encroachments of other powers, and upon his urgent representations Jacobi, the governor-general, forwarded his reports and charts to St. Petersburg.

In the meantime Golikof, Shelikhof's partner, had paid a visit to his home in the city of Kursk. The Empress happening to pass through the place on one of her voyages through the Empire, Golikof seized the opportunity to present himself before her and to display the maps and charts of his partner. The Empress was at once interested, inquired into the doings of the firm in all its details, and gave orders that Shelikhof present himself in person at the palace as

soon as he came to St. Petersburg. Immediately after the return of the Empress to the capital two expeditions were organized for the exploration of the new discoveries in the far East. One of these was to proceed by sea from the Baltic, with Kamchatka as the objective point, and the command of the enterprise was given to Admiral Mulovsky. The other expedition was to be fitted out at Okhotsk, under command of the English Captain Billings, who was to give special attention to the American coast. The first expedition did not sail, on account of a declaration of war between Sweden and Russia at that time, while the second was delayed until the year 1790.

The governor-general of eastern Siberia was at once instructed to report the best means of fostering the commercial enterprises in the Pacific Ocean and of maintaining Russian supremacy over the new discoveries; and he was also to report a system of management of the native tribes, in order to extend to them the benefits of Christianity and civilization and to improve their mode of life.

In order to secure Russia's possession of her new discoveries, Jacobi considered it sufficient to send at once 30 large copper plates with the Russian coat-of-arms, and as many wooden crosses with the inscription, "Land in Russian possession." The greater part of these were to be turned over to the agents of Shelikhof and Golikof, who were already acquainted with the best localities for planting such tokens. With regard to the amelioration of the condition of the natives, the governor proposed that the tribute theretofore levied by Cossacks accompanying the traders, or by the latter themselves, should be changed to a voluntary tax, left to the determination of the native chiefs. At the same time Jacobi expressed the opinion that as long as every Siberian trader was allowed to roam at will over the islands and coasts of the Pacific Ocean the natives would always be at the mercy of these men, who carried with them crews composed of the worst elements to be found among Siberian convicts and desperadoes. He called attention to the humane and patriotic manner in which Shelikhof had conducted his enterprises and explorations, and to the fact that he had baptized many of the pagan natives and had done his utmost to instruct both children and adults, always proclaiming that everything he did was done in the name and for the glory of Her Majesty the Empress; if, therefore, the regions incorporated with the Empire through the efforts of these men were left under their control, the interests of both the Crown and the new subjects would always be duly considered, while the lawless horde of Siberian promyshleniks and convicts would be driven from the country, and thereby the most fruitful cause of strife with the natives removed forever. Jacobi was very eloquent in urging the Empress to confer exclusive privileges upon the company represented by Shelikhof and his partners; but his ardor in the matter was to a certain extent explained by the subsequent appearance of his name among the shareholders of the company.

Upon receipt of Jacobi's report and propositions and the petitions of Shelikhof and Golikof concerning their proposed further extensions of trading operations over the islands of the Pacific and the coast of America, the Empress at once instructed the department of commerce, through its president, Count Chernyshev, to make a thorough examination of all subjects pertaining to the condition and trade of those localities, and of the means of extending Russian commerce in the Pacific Ocean. The committee on commerce presented, in March, 1788, the following opinion:

> The important results obtained through the organized exertions of the Shelikhof Company deserve not only the approval of the Government of the continuance and extension of those operations, but also the most active assistance, especially taking into consideration the great expenditure incurred by the company, who has already invested 250,000 rubles without any prospect of speedy return, and whose expenses in the immediate future can not be estimated at less than 200,000. The prosecution of Shelikhof's enterprise is of the highest importance at the present time, on account of the interruption of our trade with China, which latter circumstance involves great loss to the whole of Siberia and has a pernicious influence on all Russian commerce. The goods and manufactured articles intended by the Russian merchants for the Chinese trade are now blocking up warehouses without bringing any returns, and no profit can be realized upon the capital thus invested. The articles which Russia has carried to China in order to obtain tea and nankeen are partially obtained from other powers, and a loss in this direction involves a rise in the price of exchange. Finally, the high prices of all stores and provisions needed for fitting out expeditions to the islands of the Pacific and American coast would alone justify the company to ask for some assistance from the Government, without which the operations would be necessarily limited. In consideration of the facts stated the committee takes the liberty to represent to Her Majesty that it would be well, in accordance with the request of

Shelikhof and Golikof, to place to their credit from the public treasury the sum of 200,000 rubles for twenty years, without interest, the capital to be returned in installments at convenient intervals; the sum should also be exempt from taxation. This favor would enable the company to resume their enterprise in the most vigorous manner and thereby to revive trade and traffic throughout the eastern portion of Her Majesty's dominions. The Government would always be in a position to reimburse the treasury by levying a duty of 10 per cent on goods and furs crossing the border.

The committee recommends action upon the propositions of Governor-General Jacobi in accordance with his plans, but to him should be left the appointment of commanders of fortifications established in the new region.

An addition was made to this report on recommendation of the committee in behalf of Shelikhof and Golikof, which resulted in the following imperial ukase, issued September 28, 1787:

In consideration of the services rendered by the merchants Shelikof and Golikof to the advantage of the Imperial Government in the discovery and settlement of unknown countries, and the establishment of commercial intercourse with native tribes, we most graciously present to each of them a sword, and a gold medal to be worn around the neck, with our portrait upon one side and a legend on the other, stating the reason for which the decoration was conferred. The usual letters of transmittal and commendation to accompany these awards.

Signed by us and countersigned by the president of the senate.

On his return to Irkutsk Shelikhof at once ordered the equipment of two vessels for the voyage of discovery—one being destined for the Kurile Islands and the other for the American coast and the Aleutian Islands, with the intention of establishing a settlement as far south on the coast of the mainland as possible. In the year 1787 he dispatched another vessel from Okhotsk with supplies for the stations of his company already established on the islands. In 1788 the ship *Three Saints* sailed under instructions issued by Dalarof, a Greek, who had been to Kadiak as manager of the Shelikhof colony. Two experienced sailors, Ismaïlof and Bochorof, were in command of this expedition. In the month of May the ship arrived in the Gulf of Chugatch, or Prince William Sound, where quite a trade was carried on with the natives of that vicinity; and as the price paid for a sea-otter skin at that time consisted of eight or nine needles and three or four small beads, the traffic must have been profitable. The two explorers entered the Bay of Nuchek and remained at anchor for some time in one of its many coves, which they named after Saints Constantine and Helena. All the chiefs of the neighborhood who came to visit the Russians were duly decorated with copper and bronze medals in accordance with instructions from Jacobi, but it was found impracticable to place the copper tablets claiming possession for the Russian Empire in any prominent position, on account of the thieving propensities of the natives, who would seize immediately upon any scrap of metal within their reach.

From Nuchek the ship proceeded to Yakutat, or Bering Bay. Here the head chief also received a medal, and, at his earnest request, a portrait of the prince heir, the Grand Duke Paul Petrovich. According to Bochorof's account the chief was exceedingly proud of this piece of art, but when another explorer visited the vicinity, only a year later, not a vestige of the portrait could be found, and the natives stated that immediately upon the departure of the *Three Saints* the grand duke's image had been burned with great festivities and rejoicings. This expedition also entered Lituya Bay, which had two years previously been visited by La Pérouse, and named Port des Français, the French explorer being ignorant of its earlier discovery by the Russians. Though the Russians most certainly had learned from the natives the disaster which overtook at that place two of the boats of La Pérouse, not a word of this or any other particular concerning the French visitors was mentioned in the official reports of Shelikhof's company, the ignorant traders imagining that they could keep the fact of La Pérouse's movements from their own Government. In the following year Ismaïlof alone explored most thoroughly the gulf of Kenai, or Cook Inlet. In the meantime an additional discovery had been made which increased the anxiety of Shelikhof and his partners to obtain from the Government the exclusive right of trade on the American coast.

The skipper Gerassim Pribylof had succeeded, after several vain attempts, in finding the summer resort of the fur seals, first on the island of St. George, and in the following year on St. Paul. Small numbers of these seals had been killed annually during their passage up or down between the islands of the Aleutian chain, and the skins had found a ready market on the Chinese border; but when Pribylof and his companions returned with the marvelous tale of

millions of these animals congregating on two small islands, easy of access, this branch of the trade became at once of the highest importance. To secure the overland trade with China was a question of life and death with the Siberian merchants, but as they could not compete with the staples and manufactured articles introduced into the Celestial Empire by England and Holland by sea, the trade had been declining and languishing for years. This new discovery, however, caused a sudden change in the aspect of commercial affairs on the Chinese border. The Celestials prized the skin of the fur seal above any other. They had known this kind of peltry from time immemorial—probably through shipments made from the coast of Japan—and had long since discovered a process of removing the hair and dyeing the fur in various colors. With an almost unlimited supply of this article at their command the Russian merchants could have their choice of Chinese staples most salable in the marts of their own empire.

During the few years of the existence of the Shelikhof Company, with partial protection of the Empress and exclusive privileges in the discoveries made by their own navigators, nearly all the smaller companies had gradually gone to the wall. It was not always the power conferred upon a great firm by its larger capital that gained the day in a spirited contest for a valuable trade, it frequently occurring that the employees of one company resorted to force of arms in order to obtain advantages over the others, and then, of course, the strongest company was sure to win. The only rival of Shelikhof and his company during this last period of free trade was the company named, after two of its principal shareholders, the Lebedev-Lastochkin Company. The stations of this company were located on both islands and mainland, often in close vicinity of those of their rivals, and even Captain Pribylof was in their employ when he made his important discovery; but the shrewd Shelikhof had long since bought up under various names a large number of shares in the rival company, and thereby succeeded in reaping the benefits of the discovery for himself and his own company. At home in Siberia there existed apparently the best understanding between the leading spirits of the two companies, but in their field of operation on the coasts and islands of America a bitter strife was kept up between their respective agents. This state of affairs appears all the more strange when we consider that Shelikhof was by no means the only one who held shares in both concerns, as, among others, Lebedev was almost equally interested in both companies. In spite of these circumstances the quarrels and hostile encounters between the traders increased from year to year, until on Cook Inlet the depredations committed and the raids made by one party of hunters upon the other acquired such dimensions as almost to deserve the name of warlike operations. A native Siberian by the name of Kolomin had established himself for the Shelikhof Company at the site of the present Kenai, or Redoute Saint Nicholas, where he lorded it over the natives with great severity and wanton cruelty. A Russian captain of the rival company, named Konovalof, drove him out of his fortification and caused him to build up a new settlement some 20 or 30 miles to the southward. The conqueror in this conflict, however, had no sooner begun to attend to his trade with the natives, and to send out hunting parties and explorers, than his vanquished enemy seized the opportunity to make night attacks upon any small detachments sent away to a distance from the fort; and in many of these enterprises Kolomin was assisted by the natives of the warlike Kanaitz tribe. Both parties had traders and hunters on Prince William Sound, on the other side of the Kenai Peninsula, and hostilities soon broke out in that region also. This fighting between the Russians had, of course, the most pernicious effect upon the natives, who seized upon every opportunity to fall upon the vanquished in the various encounters and kill or capture all that had been spared by the stronger party.

At this time of general anarchy, and when the very existence of the Russians in these distant regions was threatened, a new character appeared upon the scene. Shelikhof recognized that without the strong hand of some experienced man at the head of their enterprise in the colonies the business would soon prove a total loss, as every branch of it was then declining, and he finally selected a merchant from the town of Kargopol by the name of Baranof, who had displayed extraordinary energy and decision in the management of his own affairs in Siberia. Shelikhof approached him several times with request to enter the employ of his company, but being in business for himself Baranof, who had an independent spirit, always declined, until

finally he met with overwhelming losses in his own enterprises, having two or three of his trading caravans destroyed and plundered by the savage Chukches in the vicinity of Anadyrok. Shelikhof at once called upon the ruined trader and offered him ten preferred shares of his company for his services. A contract was concluded on the 18th of August, 1790, and the man who finally established the Russian Empire on our North American continent sailed for his new field of action.

The Russian Government was fully acquainted with the results of Cook's voyages and his visits to the northwestern coast of America. He had in 1778 taken possession of various points of the coast on Cook Inlet and Bristol Bay, and had made a brief stay on the island of Oonalashka, where he tarried for a few days restowing his cargo. Prince William Sound had been visited later by Portlock, Dixon, and Meares, who also extended their trading operations to Cook Inlet and even to Kadiak Island. The Spaniards also had determined the astronomical positions of many points in that vicinity, and given names to a few bays and islands. Apprehensive that such attempts might be renewed in greater force the Imperial Government had enjoined the Shelikhof Company to prevent, if possible, the seizure by foreign powers of any of the territory then occupied by the Russian traders, while Baranof was furnished with the most minute instructions upon this subject calculated to guide his actions under any emergency that might arise in such a way as to secure the actual or imaginary rights of the Russian Government in the Pacific Ocean. The English establishment at Nootka, on Vancouver Island, was considered as especially threatening to Russian interests, and Baranof was instructed to push his establishment southward in that direction as far as possible, and even to occupy Nootka itself if it lay in his power. Every vestige or mark of foreign occupation was to be destroyed and replaced by the copper tablets previously mentioned.

The first difficulty Baranof found himself obliged to cope with was the hostile attitude of the rival traders on Cook Inlet, but he made short work of these; both Kolomin and Konovalof were seized, placed in irons, and sent to Siberia for trial, and their followers were scattered over the various trading posts of both companies in such a manner as to make it impossible to communicate with each other. A cruel castigation with the knout was inflicted in most cases, in order to impress the wretches with the fact that the reign of lawlessness was at an end and that the promyshlenik no longer ruled the land.

Though small of stature Baranof was possessed of a physique of extraordinary strength and great power of endurance. He was an indefatigable traveler, and had a natural talent for management and organization. As soon as he arrived on Kadiak Island he discovered that the headquarters selected by Shelikhof were not adapted to the requirements of the larger scale of operations he had in view, and took steps at once to remove the principal establishment to the harbor of St. Paul, on the northeastern end of the island, where the settlement of that name is now located. There he had timber at hand sufficient for all the buildings of the company, and an ample harbor with many outlets, allowing ships to depart and enter with almost any wind.

As soon as the foundation was laid to the new central establishment at St. Paul Harbor Baranof returned with renewed vigor to the exploration of the adjoining coast. The skipper Bocharof was dispatched with a party of 30 men in a large skin-covered boat to examine the northern coast of the Aliaska Peninsula, and began his exploration at Issanakh Strait, between the southern point of the peninsula and the island of Oonimak. He followed the coast of the mainland northward and was well received by the natives of the few scattered villages he encountered on his way. Late in the season Bocharof's expedition arrived at the mouth of the Kvichak, the outlet of lake Ilyamna. The chief of the populous village located here treated the newcomers with the greatest consideration, and expressed his willingness to give hostages and live at peace with the Russians forever after. The approach of winter and the lack of fresh provisions, together with the appearance of scurvy among his men, caused Bocharof to make an effort to return to Kadiak. His native friends told him of a portage route across the peninsula; this he followed, discovering at that early day the quickest and safest means of communication between the Strait of Shelikhof and Bering Sea, and he returned to St. Paul Harbor at the beginning of winter with a large quantity of furs, walrus ivory, and deerskins. Baranof himself had set out early in the spring of 1793 in

two large skin boats with 30 men in the direction of Cook Inlet, but finding the yield of sea otters in that vicinity decreasing, he made his way around the Kenai Peninsula into the waters of Prince William Sound, where he entered into friendly relations with natives of all the coast villages, taking hostages from them; and at Nuchek Harbor he encountered Ismaĭlof, the commander of the *St. Simeon*, who had been cruising in search of new discoveries. After dispatching a portion of his command to the island of Sukluk (Montague) Baranof prepared to encamp on the island. Just at that time a large force of Kolosh Indians appeared in the harbor bent upon avenging some real or imaginary insult offered to one of their tribe by the Chugatch Innuits. Observing the small force of Russians, they concluded to combine revenge with profit by taking possession of the stores and trading goods belonging to Baronof. In the middle of the night they surrounded his bivouac, and under cover of darkness succeeded in throwing themselves upon the tents before the alarm was given. The panic created among the Aleutians of Baranof's party added much to the confusion, and everybody was groping for arms and ammunition in the dark, scarcely knowing in what direction to shoot, or able to discern a friend from an enemy. At last toward daylight the superior arms of the Russians prevailed, and at the same time reenforcements arrived from Ismaĭlof's ship. Twelve dead bodies of the enemy were found on the field; their wounded they had carried away with them. In Baranof's party 2 Russians and 9 Aleuts were killed and over 15 wounded. The commander himself wrote of the occurence in the following words:

> God preserved me, though my shirt was pierced by several spears, and the arrows fell thick, without doing much damage. I was awakened from a sound sleep and had no time to dress, but as soon as I had emerged from my tent I knew that we should be able to beat them.

As early as 1791 Shelikhof had conceived the idea that, in order to convince the Russian Government of the company's intention to permanently settle and develop the newly discovered country, it would be wise to construct a few ships in the colonies to ply between the new settlements and Okhotsk or Kamchatka. He acted upon this idea at once, and in the autumn of the same year dispatched to Kadiak in the ship *Northern Eagle*, under command of Lieutenant Shields, a cargo of iron, cordage, canvas, and other materials for shipbuilding. The captain of the vessel was a practical shipwright who had left the English naval service and entered the Russian army. Shelikhof, always looking about for the best means to advance his colonial enterprise, discovered the fact of Shields's practical knowledge of shipbuilding and engaged his services at once. As soon as he had the means at hand Baranof selected a bay in Prince William Sound as his future shipyard, the harbor being named Resurrection Bay. Timber of the largest size abounded in its immediate vicinity, and under Baranof's personal supervision and Shields's practical management a ship was completed in the summer of 1794. This craft had two decks, three masts, a length of 73 feet by 23 feet beam, and 13½ feet depth of hold; she measured 180 tons, and was named the *Phœnix*. This was certainly the first three-masted ship ever built on the northwest coast of America. Having no paint or tar, Baranof was obliged to cover the new craft with a coating of spruce gum, ocher, and whale oil. As soon as the *Phœnix* was launched the keels of two smaller vessels 40 feet in length were laid, and these, also, were finished the following year and named the *Dolphin* and the *Olga*.

By this time Baranof's operations had been extended beyond Yakutat or Bering Bay, and he was reaping a rich harvest of sea otters in that vicinity, principally by means of his own hunting parties of Innuits from Kakiak and Oonalashka.

The two ships of Captain Vancouver, the *Discovery* and the *Chatham*, cruised in Cook Inlet and Prince William Sound during the summer of 1794, but the great English explorer never succeeded in meeting Baranof, in spite of repeated efforts. Baranof had his instructions to keep out of the way of foreigners, and to give no unnecessary information concerning the company's business or the intentions of the Russian Government. At the same time he was afraid that Shields, the Englishman, might be induced to leave him should he meet with his countrymen. His desertion would have been a great misfortune indeed, and would have nipped in the bud all schemes of naval construction for the future. Baranof succeeded in preventing a meeting, though a few letters passed between officers of the *Discovery* and the English shipwright.

Another important event of the year 1794 was the arrival of the first mission of the Greek

Church in those waters. For several years the astute Shelikhof had petitioned the Government to dispatch priests and missionaries to the new settlements, stating that his own efforts to spread the Gospel among the pagan natives must necessarily be limited, and that he should not feel safe among such numerous savage tribes unless the peaceful doctrines of Christianity were inculcated and preached among them. In a special ukase, dated June 30, 1793, the Empress, Catherine II, instructed the metropolite Gabriel to select the best material for such a mission, and in the following year the archimandrite Ivassof, with seven clergymen and two laymen, was dispatched to the island of Kadiak from Okhotsk on two vessels. At the same time Shelikhof had asked that a certain number of Siberian convicts, especially mechanics and farm laborers, with their families, might be selected to establish an agricultural settlement on the coast of America. This request was also granted by the Empress Catherine in a ukase dated September 1, 1793, and the whole force, numbering over 200 persons, arrived at Kadiak together.

Of the convict settlers Shelikhof retained four families at Okhotsk, with the intention of sending them to the Kurile Islands, and the remainder were to be settled in the vicinity of Yakutat, but the best mechanics and laborers among them were picked out for service at the various stations of the company before the colonists reached their destination.

The members of the mission at once began work at Kadiak and went forth to preach in various directions. One of them, named Makar, went to Oonalashka and converted and baptized within a few years nearly the whole of the Aleutian tribes. Another missionary, the monk Juvenal, proceeded northward to Cook Inlet and from there to the Ilyamna region, where he was finally slain by the natives for too active interference with their polygamous practices; while a third, named Germand, established a school on Spruce Island, in St. Paul Harbor, where he lived for over forty years, instructing native boys and girls in the Christian faith and in agricultural and industrial pursuits. The other ecclesiastics remained in the immediate suite of the archimandrite, and a few years later accompanied the latter to Irkutsk, where he was ordained as bishop for the new Russian possessions on the Pacific. While returning with his new honors from Okhotsk the ship foundered at sea with all on board, and was never heard from again. This was the vessel constructed by Baranof in 1794. From that early time Russian clergymen and missionaries have never been absent from Alaska, but the number of actual communicants of the Greek orthodox churches has never exceeded 10,000 at any one time. In the course of the present century seven organized parishes and three mission stations were established, the latter all located on the mainland.

Shelikhof lived only long enough to see verified his prediction of a revival of the Chinese trade by means of the introduction of fur-seal skins. Commercial transactions at Kiakhta had almost wholly ceased for many years, but in the year 1794 the Chinese Government notified the governor of Siberia that the merchants of the celestial empire were anxious to resume their operations on the border, and at the same time new privileges were granted to the Russians in conducting the intercourse. In the following year, on the 20th of July, 1795, Shelikof died at Irkutsk, a few days after the receipt of a patent of nobility from the Empress, conferred in consideration of his services to his country; but his widow continued the management of the company's business. It had been a favorite scheme of her husband to effect the union or consolidation of the various companies trading in eastern Siberia, Kamchatka, and the American colonies, a scheme which was also favored by Ivan Golikof, one of the partners; and when the widow assumed control of the common business she used her influence to carry out her husband's wishes. The consolidation was finally effected in the year 1797, and the new firm, under the name of the Russo-American Company, obtained a charter from the Russian Government granting it the exclusive right to all the territory and the resources of water and land in the new Russian possessions, including Kamchatka, the district of Okhotsh, and the Kurile Islands. This charter, which was finally (1799) granted by the Emperor Paul, who had at first opposed the creation of such a monopoly, marks an epoch in the history of Alaska, which from that time until the transfer of the country to the United States became identical with that of the Russian-American Company. The privileges conferred by the charter were very great and of the most exclusive nature, but at the same time the company was burdened with some heavy obligations, being compelled to maintain

at its own expense the government of the country, a church establishment, a military force, and at various points in the Territory magazines of provisions and stores to be used by the Government for its naval vessels or troops whenever it was necessary. At a time when all such stores had to be transported from Russia overland through Siberia this was the most burdensome clause of the charter, and numerous petitions were forwarded by the company to be relieved from its provisions. Under this charter the company paid no royalty or rent to the Government, but the treasury was in receipt of large sums in the shape of duty on teas carried by the company over the Chinese border. The records show that in some years as much as 2,000,000 rubles were paid by the company to the Government for these duties alone. The company was also obliged to make experiments in the establishment of agricultural settlements. The natives were freed from all taxes in skins or money, but those who were under its control were obliged to furnish a certain quota of sea-otter hunters to the company every season; all men between the ages of 18 and 50 being liable to this duty, but not more than one-half of this number could be called upon at any one time.

The management of the company was placed in the hands of the administrative council, composed of shareholders in St. Petersburg, with a general office at Irkutsk and a chief manager residing in the colonies, who had to be selected from officers of the Imperial Navy of a rank not lower than post-captain. The chief manager had an assistant, who was also a naval officer, and each received a salary from the company independent of his pay from the Government. As long as the company maintained a military or naval force in the colonies at its own expense such forces were entirely at the disposal of the chief manager; and the company also had the privilege of selecting the soldiers and sailors in its employ from any force stationed in Siberia, which gave it the opportunity of picking out such mechanics and tradesmen as were most useful in the colonies. The company was also permitted to purchase at cost price powder, lead, and arms from the Government works in Siberia. The chief manager had full jurisdiction over all offenders and criminals within the colonies, with the exception of capital crimes; offenders of that class were given a preliminary trial and then forwarded to the nearest court of justice in Siberia. In case of mutiny or revolt the powers of the chief manager were absolute. The servants and employees of the company were engaged for a certain term of years, at the end of which time the company was obliged to furnish them free transportation to their homes, unless the unfortunate individuals were indebted to it, in which case they could be detained until the debt was paid. This privilege enabled the companies to retain in the colonies any men among the lower class of employees whose services were desirable, as the miserable pittance allowed to the employees made it an impossibility to keep out of debt. Even among the higher officials were many who had served one period of seven years after another without succeeding in clearing themselves sufficiently from their obligations to the company to be allowed to return to their homes.

The charter was granted for a period of twenty years, counting from the year 1799. The company also had the right to carry its own flag, to employ naval officers as captains of its vessels, and to call itself, "under the highest protection of His Imperial Majesty, the Russian-American Company." In the meantime the new company began to attract considerable attention at St. Petersburg and Moscow, nobles and high officials of the Government buying shares, and finally the Emperor and members of the imperial family began to invest; the latter, however, making their investments under the pretext of donating their shares to schools and charitable institutions. It was the first enterprise of the kind in the Russian Empire, and under imperial patronage rose rapidly in public favor. Its most sanguine supporters prophesied for it a future prosperity as great as that of the English East India Company; and many of the shareholders were dreaming of an annexation of Japan and perhaps portions of China on one side of the Pacific, and of the whole coast down to the Gulf of California on the other.

A nobleman high in office and of very influential connections, Count Nikolai Rezanof, chamberlain of the Emperor, had married a daugher of Shelikhof. His wife died two years after the marriage, but the count had identified himself with his father-in-law's enterprise, and the final development of the company into the grand monopoly was chiefly due to his incessant exertions and his judicious advice to his mother-in-law, the widow of Shelikhof.

Baranof in the meantime had been very successful in extending the domains of the company. In the year 1799 he extended his operations to Sitka, a region which had been explored a few years previously by Captain Shields under Baranof's orders. Shields had met there two ships belonging to American traders, who informed him that both English and American vessels frequently obtained cargoes of sea-otter and other skins in that vicinity. Anxious to locate himself at a point where he could communicate with vessels of other nations and purchase supplies of them, Baranof made up his mind to establish himself permanently in the Bay of Sitka or Norfolk Sound, and proceeded to that locality in the brig Catherine, accompanied by a large fleet of Innuit hunters and their bidarkas. With the assistance of these he secured over 1,500 sea-otter skins within a few weeks, and then began the construction of a fortified trading post, the site selected for which was distant about 6 miles from the present Sitka. During the winter of 1799 and 1800 his whole force was busy erecting substantial log houses and a high stockade surrounding them. In the spring of 1800 some American trading ships made their appearance, and the owners carried on a brisk traffic under the very eyes of Baranof, who at once forwarded dispatches to the administrative council of the company, representing that the government must put a stop to such infractions upon their privileges. The strangers obtained most of their sea-otter skins in exchange for fire-arms, and paid no attention to Baranof's remonstrances. As soon as the Americans had left Baranof returned to Kadiak, where he found the employees of the company in a state bordering on insurrection. There had been disputes between officers of the company and members of the clergy, each declaring himself independent of the other, and the bad feeling had extended even to the ranks of the common laborers. No attention was paid to the orders of the company's agent in charge, and a few bold spirits had already commenced to fit out one of the small vessels of the company for the purpose of leaving for other climes, when Baranof returned and in a few days succeeded in restoring order, punishing the chief offenders with great severity. A man by the name of Larionof made an attempt to assassinate the chief manager, but Baranof seized his assailant's hand wrenched his weapon from him, and strangled him to death with his own hands.

The loss of the ship *Phœnix*, which occurred about this time, interfered most seriously with Baranof's plans, as he stood in great need of both goods and men. The garrison he had left at Sitka was a small one, surrounded by numerous hostile tribes. He felt the necessity of reenforcing his establishment there, while he saw himself powerless to send any succor of supplies or promyshleniks. Rumors of war with England had reached the colony and added to Baranof's perplexities. He set out at once on a round of the several trading establishments to warn the traders and give instructions how to act in case of the appearance of hostile cruisers. During his absence news was received at Kadiak of the destruction of the Sitka settlement by the natives, which disastrous event was the result of a preconcerted plan on the part of all the native tribes inhabiting the neighborhood. On a certain day, when over half of the small garrison was absent from the fortification hunting or fishing, a force of several thousand armed men surrounded the blockhouse, and, assailing it from all sides at once, soon gained an entrance. All the inmates, including the commander, Medvednikof, were massacred at once, and over 3,000 sea-otter skins were taken from the warehouse. Of the men who were absent at the time of the attack 3 Russians and 5 Aleuts succeeded in hiding in the woods until they could communicate with an English vessel anchored in the vicinity. Eighteen women who had been washing clothes in the river were taken and held captives by the Indians. The captain of the English vessel referred to, Barber by name, succeeded in enticing two of the most prominent chiefs on board of his craft and into his cabin. After feasting them at his table and plying them with drink he placed them in irons, and, having quite a battery of guns, was able to make his own terms for the release of his prisoners. These terms were the surrender of the captive women and of 2,000 sea-otter skins. After some hesitation on the part of the savages the conditions were accepted, and Barber sailed at once for Kadiak. Here the captain demanded of Baranof for his men and women a payment of 50,000 rubles for the time spent in rescuing them. With this demand Baranof could not or would not comply, and after many days an agreement was arrived at on the basis of the payment of 10,000 rubles.

Nearly at the same time with the Sitka disaster 180 Aleutian hunters were surprised and massacred at various points in the vicinity, and one party, consisting of nearly 100, perished almost to a man from eating poisonous mussels, in the strait separating Baranof from Chichagof Island, which derived its name from this disaster (the Russian name was Pogybshie Strait, meaning "destruction" strait, not "peril," as it has been translated by American geographers). Attacks upon hunting parties were made at many other points along the coast inhabited by the Thlinket or Kolosh.

At this time one disaster after another overtook the Russian colonies in America. Three ships loaded with provisions and stores were wrecked on their way from Kamchatka, and the employees of the Russian-American Company were on the verge of starvation, when an American ship arrived at Kadiak from New York, enabling Baranof to purchase a cargo, consisting chiefly of provisions, for 12,000 rubles. A portion of these supplies was at once forwarded to Yakutat and Sitka, while Baranof himself proceeded to Prince William Sound to wind up the affairs of the Lebedev and other companies which were still represented by hunting parties in that region. In Prince William Sound Baranof met Kuskof, who had been in the vicinity of Yakutat in charge of a hunting party of 300 canoes, and reported that he had repulsed an attack by the natives with considerable loss to the latter. He was still unaware of the disaster that had overtaken the new settlement of Sitka, but as soon as he heard of it from Baranof he proposed that they should both repair to the scene of action at once and inflict punishment upon the hostile Kolosh. The chief manager did not act upon Kuskof's suggestion, chiefly because the only vessel at his command was the *Katherine*, a schooner of less than 50 tons burden, and but poorly provisioned, while Kuskof's hunting party had only just returned from a long voyage along the coast and a series of combats with the warlike Kolosh. Before returning to Kadiak Baranof visited his shipyard on Prince William Island and laid the keels of two more vessels to be employed in cruising along the coast occupied by the Kolosh for the protection of his hunting parties. At Kadiak he found dispatches from Siberia that had been saved from one of the wrecked transports and forwarded by canoes. A change of rulers had taken place in Russia, and Alexander I had succeeded the emperor Paul. The commander at Okhotsk, in making the announcement, forwarded an order to assemble all the natives of Kadiak and the "surrounding countries," in order to inform them of the ascension of the new emperor to the throne and to demand from them the oath of allegiance.

Situated as Baranof then was, almost without provisions and unable to rely upon his few followers of Russian extraction, he thought it unsafe to assemble a large number of natives at his headquarters, where they would easily discover his temporary weakness, and consequently he did not carry out the order from Okhotsk. One of his subordinates, a Mr. Talin, who had been an officer in the navy, but was dismissed for bad conduct, sent a lengthy report on the subject to Irkutsk, making various other charges against Baranof in addition to his apparent disobedience of orders. The complaint was duly forwarded to St. Petersburg and laid before the senate, but that body decided that under the company's charter Baranof was not subject to any orders from the local commander at Okhotsk. An order for the dismissal of Talin was the result of the investigation; but, unfortunately for Baranof, the document was delayed nearly two years in transmittal through Siberia to the Russian colonies, and during all that time Talin succeeded in creating disturbances wherever he was stationed on the American coast.

Shelikhof had petitioned the Russian Government some time before his death for permission to employ naval officers on leave of absence as commanders of his trading vessels, but the request was granted only at the time of the consolidation of the various companies, a clause to that effect being incorporated in the charter of the Russian-American Company; and in the year 1801 two capable officers of the navy, Lieutenants Khvostof and Davidof, received permission to enter the company's service. Up to that time the ships sailing from Okhotsk and Kamchatka were managed by "morekhods," that is, "sea-faring men." This title was applied to anybody who had made a sea voyage, no matter in what capacity; but they were generally hunters or trappers from Siberia who had some slight experience in flatboat navigation on the rivers. They were entirely ignorant of nautical science and unacquainted with the use of instruments,

relying altogether upon landmarks to make their way from Asia to America. The most extraordinary instances of stupidity in managing their vessels are related of some of these so-called navigators. Once out of sight of land they were lost, and compelled to trust to chance in hitting upon the right direction to make the land again. It was the practice to coast along the Kamchatka shore until nearly opposite the Commander islands, and to wait for some clear day when the latter could be sighted; then the crossing was made, and satisfied with such a brilliant result, the skipper would beach his craft for the remainder of the season, and pass the winter in k'lling fur seals and sea cows and salting down the meat for his farther voyage. Late in the following spring, rarely before the month of June, the vessel was launched again and headed at a venture to the nearest islands of the Aleutian chain. If the captain succeeded in finding the land he would proceed along the chain of islands, keeping a short distance to the northward, careful never to lose sight of the mountain peaks. As the trapper captain with his crew of landsmen knew nothing of keeping his craft up to the wind, no progress was made unless the wind was absolutely favorable; and thus another season would pass before Atkha or Oonalashka Island was reached, where the craft was hauled up again for the winter. A term of seven years was frequently consumed in making the round trip to the American coast and back again to Kamchatka or Okhotsk, a voyage that at the present time a schooner can accomplish in about three weeks. At least 75 per cent. of all the vessels that sailed upon these voyages from the discovery of the American coast to the beginning of this century suffered wreck, and every one of these disasters could be traced to the ignorance both of captains and sailors.

The arrival at Okhotsk of the two naval officers above referred to forms an epoch in the history of Russian navigation in the north Pacific. They were both young and active and proceeded with great energy in their work of reform, their first voyage from Okhotsk to Kadiak being performed in the unprecedented time of two months, in an old vessel of wretched construction and without a single practical sailor in the crew. From that time forward the company always had numbers of naval officers in their employ, and in a few years their vast shipping interest was managed in the most systematic and economical manner.

In the year 1802 the company, through Count Rezanof, petitioned the emperor for permission to ship supplies to the colonies by sea from St. Petersburg. The request was at once granted, and a number of naval officers were detailed to navigate two vessels of between 400 and 500 tons burden, purchased by the company in London, and named the *Neva* and *Nadaishda*; the former was commanded by Captain Lissiansky, and the latter by Captain Krusenstern. Rezanof himself was ordered to accompany the expedition in the capacity of government inspector of the colonies and special ambassador to Japan, and was also invested by the Russian-American Company with the powers of its plenipotentiary agent in the colonies. He sailed on the *Nadaishda* and proceeded directly to Kamchatka on his way to Japan, arriving at Petropavlovsk in July, 1804, after a voyage of nearly a year. The *Neva* arrived at Kadiak at the beginning of the same month. Here learning that Baranof had already left his headquarters for another visit to Sitka, intending to rebuild his settlement and punish the savages, Lissiansky sailed at once for that place, being anxious to assist in the enterprise.

Baranof in the meantime had been delayed at Yakutat, fitting out two small sloops built during the preceding winter. His whole squadron consisted of three vessels, in all considerably under 100 tons burden, with about 40 Russians and several hundred Aleutian hunters, and with this small force he intended to attack the powerful tribes inhabiting the vicinity of Sitka, numbering several thousand warriors; but to his agreeable surprise he found the *Neva* anchored in the roadstead when he arrived at Sitka. He made a formal demand upon the chiefs for restoration of the furs stolen from the warehouse at the time of the massacre and for the surrender of a number of hostages as security for their future conduct. These demands met with prompt refusal, and hostilities began. A party of promyshleniks, Aleuts, and sailors from the ship, commanded by Baranof, made an attack upon a large fortified inclosure, but were beaten back with some loss; three sailors and eight promyshleniks being killed, and Baranof, Lieutenant Arbuzof, and Midshipman Povalishin wounded. The approach of night prevented further operations, but the following day the ships approached the beach and bombarded the

hostile camp. On the next day another attack was made with the same result as before, but during the night following the savages abandoned their fortification and retreated to Chatham Strait. With the assistance of Lissiansky and his men a fortification was erected on a steep, rocky eminence, the present site of the so-called castle in Sitka. Around this nucleus quite an extensive village sprang up within a few months, separated from the adjoining Indian village by a high stockade. Twelve cannons were planted at a point commanding the immediate surroundings as well as the entrance to the bay. As soon as Baranof had firmly established himself in his new position Lissiansky left for Kadiak and there passed the winter; but in the spring he returned, and finally sailed for Canton with a cargo of furs valued at considerably over a million rubles.

Rezanof's mission to Japan proved an utter failure, as, after detention in one of the Japanese seaports for ten months, he was coolly informed that he could not see the Emperor. He returned to Kamchatka, and from there proceeded to Kadiak and to Sitka in the year 1805. He turned his attention exclusively to the organization of the colonies and to bringing order and system into the affairs of the Russian-American Company, and was the first to put a check to the indiscriminate slaughter of fur seals on the Pribylof Islands. When Rezanof in company with Baranof finally visited Sitka they found the magazines almost empty and famine staring them in the face. At last a ship from Boston made its appearance in Norfolk Sound and brought much-needed relief. Rezanof bought both ship and cargo and employed the former to bring farther assistance. In a few days he was on his way to California, the nearest coast from which grain or flour could be obtained, reaching the Bay of San Francisco, after a long and stormy passage, in so wretched a condition that when the Spanish officers visited the ship Rezanof ordered the crew to be kept out of sight, in order to conceal as far as possible from the strangers the extent of their distress. It was against the colonial laws of Spain to hold any intercourse with foreign vessels, but Rezanof, with the assistance of the missionaries, succeeded in overcoming the scruples of the governor, and filled up his ship with grain, tallow, and meat; and after a stay of several months, during which he engaged himself to marry the daughter of the commandant of San Francisco, he sailed again for Sitka, with the intention of proceeding at once to St. Petersburg by way of Siberia, in order to ask the Emperor's consent to his marriage with a foreigner.

Rezanof's visit to California was the beginning of commercial intercourse between the Russian and the Spanish colonies, of vital importance to the former.

The chamberlain had, during his sojourn in San Francisco Bay, written to the Emperor and to the directors of the Russian-American Company, submitting plans for the extension of the Russian domain and of the operations of the company in the direction of California. He spoke in glowing terms of the natural resources of the latter country, urging the establishment of an agricultural colony on the coast north of San Francisco, then called New Albion, stating, quite truly, that up to that time the Spaniards had no permanent settlement north of the Presidio of San Francisco. With singular foresight he considered the fact that among the hunters and trappers in the Russian colonies it would be impossible to find laborers familiar with agricultural pursuits, and therefore suggested that the "patient and industrious Chinese" should be imported to labor on the Russian plantations; which proposal, made in 1806, is certainly the first on record looking to Chinese immigration to the Pacific coast.

Before his departure for St. Petersburg Rezanof laid the foundation of a very important change in the management of the company's affairs. Up to that time all employees had been engaged under the old system of allowing shares in the proceeds to all laborers; but Rezanof understood the inconvenience and injustice arising from such a system as the company's operations increased in magnitude, and he left positive orders with Baranof to introduce the payment of annual salaries to all employees as soon as practicable. On his way to St. Petersburg the chamberlain gave orders for the organization of an expedition, consisting of two ships under command of Lieutenants Kfvastof and Davidof, against Japan, to avenge the slight put upon Rezanof and his embassy. His instructions were only partially carried out by the two officers named, who thereby involved themselves in the most serious difficulties with the Siberian

authorities. From Okhotsk Rezanof proceeded overland through Siberia, but was detained at various places by sickness and once by a fall from his horse; and his injuries, aggravated by disease, caused his death at the town of Krasnoyarsk, in Siberia, on the 1st of March, 1807. With him died the most earnest promoter of Russian interests in the north Pacific.

At the time of Rezanof's departure the chief manager reported that the Russian-American Company then possessed the following fortified stations: One at Three Stations Harbor, one on St. Paul Island, one on Kadiak Island, one off Afognak Island, one at the entrance to Cook Inlet (Alexandrovsk), three on the inlet—St. George, St. Paul, and St. Nicholas; and two on Prince William Sound, one of them at Nuchek and the other on Sukluk Island, Zaikof Bay. In addition to these there was the fort St. Simeon, near Cape St. Elias; two forts in the Bay of Yakutat, and finally New Archangel, in the Bay of Sitka. The fortifications were nearly all armed with 3-pounder brass guns. The number of small arms, rifles, and shotguns in the colonies was about 1,500.

The number of Russian employees was then 470, of which 69 were in the district of Oonalashka. Experiments in agriculture had already been made in nearly every section of the colonies, but without success except in the cultivation of potatoes, turnips, and cabbage. The small breed of Siberian cattle had been successfully introduced at Kadiak.

After the first expedition of the *Neva* and the *Nadaishda* the company continued to send supplies and reenforcements by sea from St. Petersburg. The former ship was fitted out immediately after returning from her first voyage under command of Captain Hagemeister. The presence of naval officers in the colony had led to complications between the chief manager and the former, who were inclined to ignore any suggestions or requests made by a mere "civilian" or "kupetz" (trader). Complaints and charges arising from these difficulties were forwarded to St. Petersburg, and, upon Rezanof's suggestion, the Emperor conferred upon Baranof the rank of "commercial councilor," in order to give him a certain official standing. The commission was accompanied with a gold medal and the order of St. Anne of the third class, for distinguished services. Baranof was, of course, highly gratified at his elevation and the recognition of his services by the Emperor, but his promotion did not save him from endless disputes with Government officers in the colonies; which continued until he left, and embittered his whole after life.

In the meantime the establishment of the Russians on the Northwest coast had attracted the attention of American merchants, especially those of Boston, who began to send their ships to Norfolk Sound and to Kadiak, laden chiefly with provisions most acceptable to the Russian colonists. In payment for such supplies they accepted fur-seal skins at the rate of $1.25 (Mexican) each; these being subsequently disposed of in the Chinese seaports at an immense profit. Others entered into an agreement with Baranof to hunt sea otters, with native hunters furnished by him, on equal shares. The field of operations for these enterprises was generally the coasts of California and Oregon.

In the year 1811 Baranof at last carried out Rezanof's suggestion and established himself on the coast a short distance north of San Francisco Bay. His next in command, Kushkof, was dispatched with a number of men, and succeeded in effecting a lodgment at Bodega, where he obtained a tract of land from the Indians "by purchase." The Indians at the time declared that they were entirely independent of the Spaniards, who had never advanced northward from the presidio of San Francisco. The Spanish Crown, as is well known, claimed a title to the whole Northwest coast of America by "right of discovery."

At that time Baranof was annually extending his intercourse and joint ventures with the traders from Boston and other American ports. He had close at hand in the seal rookeries of Bering Sea an almost inexhaustible treasury, furnishing the means to pay all demands of his foreign friends without making drafts upon the home office at St. Petersburg. When the Kolosh Indians of Yakutat had destroyed the company's settlement at that place Baranof employed the Boston captain, Campbell, with his ship, to intimidate the hostile natives into a surrender of a few captive survivors, and during a single year the company's share in sea-otter expeditions, undertaken in partnership with these Yankee skippers, along the California coast, amounted to 200,000 or 300,000 rubles. In many instances, however, these shrewd "partners" managed to

secure to themselves the best of the bargain. Once a Captain Bennett sold his cargo of provisions and stores for fur-seal skins at the rate of $1 each, and then sailed across to Kamchatka and sold the skins to the company's agent at Petropavlovsk at $2 each. These and similar transactions were duly reported to the company's home office, accompanied by demands for the appointment of a successor to Baranof, who was represented as a mere plaything in the hands of the foreign traders, who got into his good graces by wining and dining him in their cabins. The peculiar circumstances attending the attempt of Hunt, the agent of Astor, to negotiate with Baranof have been graphically described by Washington Irving in his sketch of Astoria.

The directors of the Russian-American Company became thoroughly alarmed at the reports of the large sums diverted into foreign channels from their own domains, and instructions were promptly forwarded to Baranof to change his policy. This communication was accompanied by the announcement that another ship, the Suvarof, commanded by Lieutenant Lazarev, was being fitted for a voyage to the Russian colonies. The vessel sailed from Cronstadt on the 8th of October, 1813, and arrived at Sitka November 14, 1814, having been delayed nearly four months in England waiting for a cargo. She had scarcely been moored at her anchorage when disputes arose between her commander and the chief manager of the colonies, the question of relative rank being of course involved, and giving additional bitterness to the contest. Lazarev finally refused point blank to obey Baranof's orders, and sailed from Sitka without final instructions. In his rage Baranof discharged a few of his cannon after the retreating ship, without, however, doing any damage, and Lazarev proceeded to San Francisco, and thence to South American ports, buying up a valuable cargo of the products of the tropical climes, which met with ready sale in Russia. The value of the whole shipment by the Suvarof, including the furs, was estimated at considerably over a million rubles. In his reports to the Emperor and to the directors of the Russian-American Company Lazarev reported the doings and character of Baranof to his disadvantage, and arrangements were made at last to select a successor.

A Dr. Scheffer had gone out to the colonies in the capacity of surgeon of the Suvarof, but during that vessel's stay in the harbor of Sitka the doctor had quarreled with the officers, and finally left the ship and placed himself under the protection of Baranof; the latter taking a great fancy to the foreigner, who could boast of great linguistic ability and a general polish acquired in a life of adventure. Through the medium of the Boston skippers messages and presents had been exchanged between Baranof and King Kamehameha of the Sandwich Islands. Scheffer seized upon this circumstance to work upon Baranof's ambition, and together, inspired by copious draughts of Sandwich Islands rum, they formed the scheme of colonizing and finally annexing those islands to the Russian Empire.

Scheffer was dispatched to the island of Hawaii as diplomatic agent, provided by his ambitious patron with ample means and full powers. He found Kamehameha fully controlled by the English, but, nothing daunted, he proceeded to the island of Kaui, which was then under the rule of King Tomare, and endeavored to incite the latter to throw off his allegiance to Kamehameha and place himself under the protection of the Emperor of Russia. With the assistance of quite a large force of Aleutian laborers, Scheffer erected buildings and planted gardens and fields, the gift of Tomare, whose wife he had succeeded in curing of intermittent fever. This enterprise was maintained for several years, and, upon Baranof's earnest application, the company's authorities endeavored to enlist the Imperial Government in its aid. A magnificent gold-embroidered uniform, a general's chapeau, and some gold and silver medals were forwarded to Tomare from the court of St. Petersburg, but, fully aware of its weakness at sea, the Russian Government refused to go beyond this in support of the company's enterprise. In the meantime, English and American intrigue had been active at the court of Kamehameha, who finally took active measures to restore his supremacy over the rebellious Tomare. The latter became alarmed at the nonarrival of Russian reenforcements promised by Scheffer, and at last compelled him to fly from the islands. Two ships belonging to the company's service had been lost while attempting to convey supplies to the Sandwich Islands settlement, and altogether the enterprise was attended with pecuniary loss of such magnitude as to draw upon Baranof the severest censure of the board of directors.

A life of dissipation, old age, and constant struggles with savages and his own scarcely less

savage subordinates, as well as the irritating quarrels with Government officers, began to tell upon Baranof's health. Ever since the year 1809, when two promyshleniks, Naplavkof and Popof, who had organized a conspiracy to kill Baranof, fit out one of the company's vessels with arms, provisions, and merchandise, and to make their escape to one of the South Sea Islands, where they proposed to lead a life of perpetual bliss, the chief manager had given evidence of a broken spirit. The conspiracy was suppressed without bloodshed, one of the members having proved traitor, but its effect upon Baranof's mind could be detected in all his subsequent transactions. Twice the directors of the company had resolved to relieve him; and once, in 1808, they appointed Collegiate Assessor Koch to that position, but he died in Kamchatka before reaching his destination. Seven years later another officer of the civil service, Collegiate Councilor Bornovolokof, was sent out on the ship Neva, but the vessel was wrecked within a short distance of Sitka, and Bornovolokof lost his life. At last, in 1817, Captain Hagemeister was sent to Sitka in the ship Kutuzof, with instructions to relieve Baranof as chief manager of the colonies. He arrived in the same year, but did not introduce himself in his real capacity. He remained at Sitka inspecting and investigating the company's affairs until the 11th of January, 1818, when he suddenly produced his commission and ordered Baranof to turn over his command to him. The shock of this sudden revelation was too great for the old man who began to fail more rapidly from that day. With the assistance of a few of his former subordinates he arranged his papers and transferred to Hagemeister both movable and immovable property far exceeding in value the amounts called for by the returns of the company. Though millions had passed through his hands he found himself at the age of eighty a poor man. Very much enfeebled in health, he sailed on the ship Kutuzof in the autumn of 1818. For some unexplained reason, Hagemeister, his successor, sailed on the same ship, leaving a Lieutenant Yanovsky in charge of colonial affairs. On the voyage home the Kutuzof was detained for some time at Batavia, and, against the advice of the physician, Baranof insisted upon passing that time on shore, where he was attacked with malarial fever, and with the greatest difficulty was taken on board when the ship was ready to sail. The following day, the 16th of April, 1819, the creator of Russia's domain on the North Pacific, breathed his last.

Lieutenant Yanovsky, who had been left in temporary charge of the colonies by Hagemeister, did his best to carry out the wishes of the company concerning a thorough exploration of the territory, and expeditions were sent out by land and sea in various directions, resulting in the discovery and preliminary survey of the coast from Bristol Bay westward to the mouth of the Kuskokwim River and Nunivak Island. One party of explorers even reached the vicinity of Norton Sound, without, however, discovering the Yukon River, the mouth of which must have been passed by the boats of the expedition. Another exploring party proceeded from the mouth of the Nushagak River into the interior, and succeeded in crossing over the mountains and tundras into the valley of the Kuskokwim.

The work of changing the company's system of hiring laborers on shares to the employment of men with fixed salaries was completed by Yanovsky under Hagemeister's direction.

Occasional intercourse was still carried on with the Boston traders, but not on its former scale of magnitude. In 1818 Hagemeister made a contract with a Captain Roquefeuille, who had been fitted out by several merchants of Marseilles for the purpose of opening the northwest coast of America to French trade. Roquefeuille saw at once that he could not compete with the Russian-American Company in opening trade, and therefore made an agreement with the Russian chief manager to hunt sea otters on shares with the assistance of natives. He received 30 bidarkas (of two men each), under the condition that in case of loss of life or accident during the voyage the French captain was to reimburse the company or the hunters' families, the price of a life being fixed at $100.

Two weeks after leaving Sitka Roquefeuille's ship was attacked by the Hyda Indians inhabiting the southern end of Prince of Wales Island. He succeeded in beating them off, but a party of his hunters, consisting of 20 men and 3 women, who had landed some distance from the ship, were butchered by the savages. Roquefeuille made a few attempts to trade with the

natives after this agreement, but his goods were of an inferior character and he failed to secure a single skin. He returned to Sitka, paid for the 23 lives lost, and sailed away, and on his arrival at Marseilles convinced his patrons that there was no field for French enterprise in the North Pacific.

The settlement established by Baranof on the coast of California had by no means remained undisturbed. When the Spanish authorities at San Francisco discovered that the Russians had located themselves permanently, they sent an officer with several men with a peremptory demand that the Russians should leave at once a coast claimed by the King of Spain. Kushkof, who was then in command, managed to postpone action in the matter on the plea of having no authority, and in the following year Baranof sent Lieutenant Podushkin to the governor of California with a declaration that the company's colony was located on land purchased of the Indians, and that he could not withdraw it until the courts of St. Petersburg and Madrid had decided the question. At the same time he made proposals for a sea-otter hunt along the California coast on joint account of the Russian-American Company and the California authorities, offering the latter high prices for the skins. The offer was tempting, and, though officially declined, was privately accepted. The Russians remained undisturbed on their farms at Bodega Bay, and the coffers of the Spanish officials and missionaries began to fill with the bright dollars received in payment for sea otters killed by Innuit hunters in Spanish waters. The principal motive of Rezanof in ordering the establishment of this colony had been to secure a depot of breadstuffs for the northern stations, but in this respect the enterprise proved a failure, owing to the very cause foreseen by the chamberlain.

The Siberians and the Aleuts were but indifferent farmers, and would go off on hunting expeditions just at the time when the ground ought to be plowed or the seed put in, and the consequences were short crops and a demand for supplies from Sitka. In cattle breeding the arctic farmers met with no better success. Large herds were purchased from the Spaniards, but the Aleut herdsmen were in mortal dread of the huge animals, unlike anything they ever saw at home, and at the least display of unruliness on the part of the cattle they would fly to the station, leaving their trust to the mercy of marauding Indians. Failing in these two objects the manager of the colony began to experiment in shipbuilding, using the wood of the live oak and cedar covering the hillsides.

The privileges granted the Russian-American Company by the Emperor Paul expired with the year 1820. The business of the company during the preceding twenty years had, on the whole, been very profitable, and the most strenuous efforts were made to get an extension of the privileges for another period of equal length, and owing to the fact that many nobles of high standing, and even members of the imperial family, were shareholders, this object was easily attained. The Emperor Alexander I not only extended the old privileges but made some valuable additions to the rights conferred upon the company by the charter, and in the year 1820 the company reported the payment of a biennial dividend to the shareholders amounting to 1,195,495 rubles, while for the years 1816 and 1817 it had been 1,156,950 rubles.

The population of the colonies under full control of the company (exclusive of the independent native tribes) was given at 391 Russians, 444 creoles, and 8,384 natives.

The fleet owned by the company and engaged in traffic in the colonial waters in the year 1820 consisted of one brigantine of 306 tons, three brigs of 200 tons, two schooners of 120 and one of 60 tons; and three sloops, one of 60 and two of 30 tons each. In addition to these the company had purchased five foreign barks and ships for the voyage from St. Petersburg to the colonies, and eight others for service in the colonies.

In the year 1821 Hagemeister was relieved by Mikhaïl Ivanovich Muraviev, who continued the work of organization of the colonies and managed the company's trade. Hagemeister urged removal to the island of Kadiak, which offered a much more pleasant and comfortable place of residence than Sitka, but it would have been necessary to maintain quite a large force at the latter place to keep in check the warlike and unruly Kolosh. Up to the year 1823 the district of Atkha had been attached to the Okhotsk office of the Russian-American Company, but the impracticability of such an arrangement became obvious, and all the Aleutian Islands were

transferred to the immediate jurisdiction of the chief manager of the colonies, and from that time dates the separate existence and management of Russian America.

The boundary of the Russian possessions was finally settled under Muraviev's administration. The treaty was concluded between Russia and the United States on the 17th of April, 1824, and with England on the 28th of February, 1825, designating Prince of Wales Island, in latitude 54° 40′ north, and between longitude 131° and 133° west from Greenwich, as the southern line of the Russian possessions, and as its eastern boundary a line running from the head of Portland Canal northward along the summits of the coast range of mountains to a point where it intersects the fifty-sixth degree of latitude; from thence the line running to the Arctic Ocean along the one hundred and forty-first meridian. Both English and American traders were allowed to trade for a period of ten years in the waters belonging to the strip of coast up to latitude 56°.

The principal explorations undertaken during this period were made in the northern precincts of Bering Sea by two skilled navigators, Etholin and Kromchenko, the former of whom subsequently rose to the rank of chief manager of the colonies. Their surveys are still our best authorities for the coast line included in their labors. An Arctic expedition had been organized as early as the year 1815, by Count Rumiantzof, at his own expense. He fitted out the brig *Rurik*, and placed in command Lieutenant Kotzebue, of the navy. The german poet and scientist, Adelbert von Chamisso, accompanied this expedition, which resulted in the discovery and survey of Kotzebue Sound and the Arctic coast of America as far as Cape Lisburne.

In 1826 Muraviev was relieved by Captain Chistiakof. In this period occurred the exploring voyage of the sloop of war *Seniavin*, commanded by Captain Lütke, who subsequently compiled an atlas of the Alaskan coast and islands and published a valuable work describing the country.

The work of Christianizing the natives of the Russian colonies had been prosecuted with increased vigor since the renewal of the company's privileges in 1821, and in 1823 the priest Mordovsky arrived at Kadiak with two missionary monks. In 1824 Ivan Veniaminof landed at Oonalashka, and in the following year Yakof Netzvetof took charge of the church at Atkha. Veniaminof especially was instrumental in spreading the teachings of Christianity over a vast extent of country, visiting not only the Aleutian Islands, but also the coast of the mainland from Bristol Bay westward beyond the Kuskokwim Delta, and in the third year from his arrival the Russian Church in the colonies numbered 10,561 communicants, of whom 8,532 were natives. All the churches and chapels were erected at the expense of the company. The schools at that time numbered but three, located at Sitka, Kadiak, and Oonalashka.

After a prosperous administration, during which much valuable information concerning the Russian possessions had been obtained by means of numerous exploring expeditions, Chistiakof was relieved, in 1831, by Baron Wrangell. This was the time when the Hudson Bay Company was most active in extending its operations on the Pacific coast, and the two vast monopolies were watching each other with suspicion. The English company made several proposals for mutual agreements looking toward uniformity in the management of their intercourse with Indians, but Wrangell had his instructions to crush the dangerous opposition if possible, without proceeding to open rupture. His sloops and schooners patrolled the channels of the Alexander Archipelago, with orders to seize all boats belonging to the English. The Hudson Bay Company had stations on the upper course of the Stakhin River, which they were anxious to supply by water, sending ships into the mouth of the river, which was situated in the Russian territory. Wishing to prevent this, Wrangell sent Lieutenant Zarenbo in the brig *Chichagof* to the mouth of the Stakhin River, with orders to establish a station. This he did, constructing the Rédoute Saint Dionys on the spot where the present Indian village of Wrangell is located. Several boats of the Hudson Bay Company attempting to enter the river were fired upon and turned back. At last the British traders concluded to make the attempt on a larger scale, and fitted out a bark, the *Dryad*, commanded by Captain Ogden, with orders to establish a large fort at the head of tide-water on the Stakhin River; but Captain Ogden, finding it impracticable to ascend, returned to Vancouver Island and reported his failure. The matter was duly represented to the directors of the Hudson Bay Company in London, who presented a claim for damages against the Russian-American Company, amounting to £21,500, the alleged expenditure incurred by the company in

fitting out the *Dryad*. At this time Baron Wrangell's term of office was about to expire, and he concluded to attend personally to the settlement of this complication. Proceeding to San Francisco in one of the company's vessels, and thence overland through California and Mexico to the capital of that young Republic, he endeavored to settle with the authorities a dispute concerning the Russian title to the Ross colony on Bodega Bay. Without concluding this business, he hurried on to Hamburg, where he met two commissioners of the Hudson Bay Company, including Sir George Simpson, and an amicable arrangement was quickly agreed upon. The terms of this agreement were as follows:

1. The Hudson Bay Company abandoned all claim to the sum of £21,500, the damages for the detention of the vessel.

2. The piece of coast in the Russian possessions from Lynn Canal to the southern boundary was leased to the Hudson Bay Company at an annual rental for a period of ten years, dating from the 1st of June, 1840, the Hudson Bay Company to have the exclusive right of trade in the leased territory for the time mentioned, under condition of final surrender of all the buildings and fortifications erected on the lands thus leased.

3. The Hudson Bay Company was obliged to confine its operations to the mainland and not to trade on any island or other portion of the Russian domain.

4. The payment of rental was to be made annually in land otters, to the number of 2,000 skins, representing at the prices of that time 118,000 rubles.

5. In addition to this payment the Hudson Bay Company bound itself to sell annually to the Russian-American Company 2,000 additional sea-otter skins from the Columbia River, at 23 shillings each, and 3,000 land-otter skins from Hudson Bay, at 32 shillings each.

6. The Hudson Bay Company bound itself to furnish the Russian-American colony with a certain quantity of provisions, carrying the same on their own vessels at a fixed rate of freight.

7. In case of war the agreement was to be annulled after a notice of three months.

This agreement was approved by both the Russian and the English Governments, and the land in question was surrendered to the Hudson Bay Company. The arrangement was advantageous to the Russian-American Company, who theretofore had maintained their establishment on the Stakhin River at a loss, being unable to compete with the rival company in the interior.

In 1836, after Baron Wrangell's departure, Captain Kuprianof assumed the duties of chief manager of the colonies, and turned his attention chiefly to an extension of the company's business in the northern part of the colonial domains, where, under his predecessor's rule, Lieutenant Tebenkof had in 1835 established the Rédoute St. Michael on Norton Sound. He fitted out the brig *Polyphene*, under command of Captain Kashevarof, for an Arctic exploration, and sailed in July, 1838, succeeding in reaching Point Barrow, not with his ship, but by means of bidars, coasting from Kotzebue Sound eastward. Kuprianof made several voyages to San Francisco, attending personally to the still unsettled question in regard to the company's California colony, and inaugurating proceedings leading to its final sale a few years later. Toward the end of his administration the missionary Veniaminof was called to Irkutsk and consecrated as bishop of the independent diocese of Russian America, which up to that time had been attached to the episcopal see of Irkutsk, this change involving the erection of a cathedral at Sitka and the subsequent residence of Veniaminof (who on his consecration had assumed the name of Innocentius) at that place. In his new field of labor he devoted himself to the conversion of the savage Kolosh, and, mastering their language, translated several books of the New Testament and some hymns and a catechism. His success in the work of conversion was, however, only temporary, being confined altogether to the time of his presence among them. A seminary for the training of native and creole youths to the priesthood was also established by him, and maintained until the bishop's see was finally transferred to Kamchatka.

While the northern seacoast was being surveyed by scientific navigators, such as Lieutenants Tebenkof and Rosenberg, the interior of the country was not neglected. Glazunof and Malakhof penetrated into the recesses of the Yukon and the Kuskokwim valleys, the former ascending the Yukon (then called the Kvikhpak) as far as Nulato, and was the first to make the portage between the Yukon and the Kuskokwim in 1836, while the latter proceeded from the rédoute on the

Nushegak River to the Kuskokwim, and thence to Nulato, establishing a station, which was subsequently destroyed by the savage natives.

The fortification of St. Michael, established by Tebenkof, was seriously threatened by the natives of Kotzebue Sound in the year 1836. The rédoute was surrounded by a large force during the absence of a small detachment consisting of 9 men, with the trader Kuprianof; but the latter, observing the movements of the savages, fought his way through their lines with great bravery and rejoined the garrison, and together they succeeded in repelling all attacks.

One of the most remarkable events that occurred under Kuprianof's administration of the Russian possessions was the appearance of a smallpox epidemic extending from 1836 to 1840, inclusive. The disease first made its appearance in Sitka, November, 1836, and though at that time the company had a resident physician, Dr. Blaschke, at that place, all efforts to stay its ravages were in vain. Old and middle-aged people suffered most, attacks in their cases proving nearly always fatal; but among the children the mortality was less. The creoles, owing perhaps to their more cleanly mode of life, suffered in a minor degree, but the Kolosh, living in filth and misery, were swept away by whole families, and inside of three months 400 deaths occurred in the native village of Sitka alone. Only one Russian was attacked during that time, and he recovered. In March, 1837, the disease began to die out. Among the inhabitants of the native settlements on the interior channels of the Alexander Archipelago the mortality was also very great. As soon as navigation opened a station surgeon, Valsky, with 3 experienced assistants was dispatched to the district of Kadiak with orders to vaccinate the people; but the precaution came too late, the disease having been evidently carried to Kadiak on the same ship which brought the medical assistants. On the island of Kadiak 736 persons died. On the peninsula of Aliaska one of the assistant surgeons vaccinated 243 persons, and in that vicinity only 27 succumbed to the disease.

Dr. Blaschke was dispatched to Oonalashka, where he vaccinated 1,086 natives, and here only 130 died. In the vicinity of the trading posts on Cook Inlet, Prince William Sound, and Bristol Bay the natives refused to submit to vaccination, the consequence being that 550 persons were attacked by the disease, of whom over 200 died. The last cases of smallpox in any portion of the Russian colonies were reported in 1840.

About the end of Baron Wrangell's administration it had become evident that the expenses of the Russian-American Company in maintaining their colonies in northwestern America were increasing to an alarming degree, while the income derived from the fur trade remained stationary, or even decreased in many of its branches. The officers of the company stationed in the colonies reported that one reason for this state of affairs could be found in the fact that hundreds of feeble and superannuated employees were drawing salaries and subsistence without rendering adequate service. These individuals had grown old and lost their health in the employ of the company, and could not well be discharged and thrown upon their own resources; and in order to relieve the company from this burden, to a certain extent, the directors petitioned the Government for permission to pension off the useless employees, or to settle them in the most favorable localities as fishermen and tillers of the soil. The proposition was favorably considered by the Government, and a ukase was issued on the 2d of April, 1835, empowering the Russian-American Company to locate as permanent settlers such of their employees as had married native or creole women in the colonies, and who on account of disease or old age were no longer able to serve the company. Such settlements were to be made only upon written request of the superannuated servants, and the company was obliged to select a piece of ground, build comfortable dwellings, furnish agricultural implements, seed, cattle, and fowls, besides providing the settlers with provisions for one year. These individuals thus located were exempt from taxation and military duty, and a list of their names was to be forwarded annually with the company's report. The children of these settlers could be taken into the company's service upon their own request, at established rates of salary. The company was obliged to purchase all surplus produce of the settlers, and also such furs as they might be able to obtain. The ukase also permitted creoles to enjoy the same privileges after concluding their term of service with the company. The Russian settlers of this class were to be known officially as colonial citizens and the creoles as colonial settlers.

As localities best adapted to this purpose the chief manager selected the coast of Cook Inlet, the island of Afognak, and Spruce Island.

In 1840 Captain Etholin was appointed chief manager of the colonies, and found himself face to face with serious difficulties in the management of the native population. The smallpox epidemic had carried off a large percentage of the providers of the native families, and as a consequence whole families and communities were brought to the verge of starvation. On Kadiak and nearly all of the Aleutian Islands it had been the custom of the people to live in small settlements of one or two families each, widely scattered along the coast, and even these small communities wandered frequently from place to place in search of better hunting and fishing grounds. In their isolated condition a large number of these small families or village communities found themselves at the end of the smallpox epidemic in a condition of extreme want and out of reach of assistance from their neighbors. On Kadiak Island alone 65 village sites, occupied by a few individuals each, were enumerated.

Captain Etholin, acting upon the suggestion of his predecessor, concluded to consolidate the scattered settlements, each hamlet being unable to provide for its own existence, and to establish large villages, each under the management of a competent chief. The chiefs were to be held responsible for the collection of food supplies at the proper season, and were intrusted with the maintenance of storehouses in which each community deposited surplus provisions in times of plenty, to be issued again in times of want. This measure was energetically carried out, not only at Kadiak, but on the Shumagin and the Aleutian islands, and its effect was very beneficial.

The second term of the Russian-American Company's special privileges expired in 1841, and the directors and shareholders labored assiduously for a new grant of charter for another twenty years. The Imperial Government took some time to consider the question, but in 1844 a new charter was granted. This document increased the rights and advantages enjoyed by the company, confirmed the establishment of the two classes of colonial citizens and colonial settlers, and enlarged the colonial government by the establishment of a council to consist of the assistant chief manager and two or three naval officers stationed in the colonies, which council was invested with advisory functions only in the management of colonial affairs, but acted in certain emergencies as a court of arbitration between the inhabitants of the colonies and the company's authority.

An extensive exploration of the Yukon and Kuskokwim regions was made under the direction of Etholin. In the month of May, 1842, the brig *Okhotsk* proceeded to St. Michael with Lieutenant Zagoskin, of the navy, and five assistants. After fitting out his expedition with provisions, dogs, and canoes, Zagoskin made several journeys along the coast of Norton Sound, and finally crossed over the hills of the Coast Range into the valley of the Yukon. On the 15th of January, 1843, the expedition reached Nulato, and from here Zagoskin undertook a journey to Kotzebue Sound, but, owing to the desertion of his assistant, failed to accomplish his object and was obliged to return to Nulato. The following spring he constructed a large bidar of six oars, and set out in June upon the journey to the upper river. After advancing more than a hundred miles from Nulato the hostile attitude of the natives obliged him to return to the latter place, whence he made his way to Ikogmute, crossing over the tundras to the Kuskokwim. In the beginning of February, 1844, he established himself at the Rédoute Kalmakovsky, making a thorough exploration of the surrounding country, finally returning to St. Michael and thence to Sitka.

Zagoskin subsequently published a voluminous journal of his travels in the basins of the Yukon and Kuskokwim.

At the beginning of his administration Captain Etholin concluded arrangements for the sale of the Ross colony on the coast of California. The imperial permission for this transfer had been obtained some years previously by the directors of the company, who had become convinced that the enterprise had not resulted in any pecuniary advantage. During the occupation of the settlement ten vessels (brigs and schooners) had been constructed of timber cut in the immediate vicinity. The records show that not one of these vessels proved seaworthy for more than six

years after construction; out whether this was due to the incapacity of the builders or to the fact that the timber had not been seasoned, it is impossible to decide. There was no lack of skilled mechanics in the settlement, as we have evidence of much work performed by the Russians for their unskilled neighbors in San Francisco Bay, where sailing and row boats were built for the Mexican authorities and private individuals, and even one buggy for the use of a missionary; but having failed in its principal object of creating a never-failing supply of breadstuffs for the northern stations, the company finally sold the land, with all buildings and live stock, to a native of Switzerland, named Sutter.

Etholin also displayed great energy in establishing new schools and enlarging those already in operation in the various districts of the colonies. Under the active superintendence of his wife a home was founded in Sitka, in which the creole girls were educated, instructed in household duties and female handicraft, and finally provided with a small dowry and married to officers and employees of the company.

The clause in the company's charter requiring that the chief manager should be selected from officers of the navy had an unfortunate effect upon business. After Baranof's departure not a single practical merchant or business man had the management of colonial affairs, and the consequence was that the dividends diminished every year, while at the same time, according to the official reports to the directors and to the Imperial Government, the colonies seemed to be flourishing and developing rapidly. Each succeeding chief manager seemed to think only of making the greatest display of continued explorations, erection of buildings, construction of ships of all sizes, and the establishment of industries and manufactories. The shipyard at Sitka was as complete as any similar establishment in the Russian Empire, being provided with all kinds of workshops and magazines, even having brass and iron foundries, machine shops, and nautical instrument makers. Experiments were made in the manufacture of bricks, wooden ware, and even woolen stuffs of material imported from California. For all these enterprises the skilled labor had to be imported from Russia at great expense, and this circumstance alone will explain the failure attending the attempts. Vast sums were also wasted in endeavors to extract the iron from a very inferior grade of ore found in various sections of the country. The only real advantage the company ever reaped from its many workshops at Sitka was the manufacture of agricultural implements for the ignorant and indolent rancheros of California, thousands of plowshares of the very primitive pattern in use in those countries being made at Sitka for the California and Mexican markets. Axes, hatchets, spades, and hoes were also turned out by the industrious workmen of the Sitka shipyard, while the foundry was for some time engaged in casting bells for the Catholic missions on the Pacific coast. Many of these bells are still in existence and bear witness to the early, though perhaps abnormal, industrial development on our northern coast.

Etholin was in 1845 relieved by Captain, subsequently Admiral, Tebenkof, to whom we owe the best atlas of the coast of Alaska ever published. The hydrographic notes were very copious and correct, and nearly all subsequent charts and maps have been based upon his surveys. He brought the colonial fleet into a high state of effectiveness, but of the fur trade he knew no more than his immediate predecessors, and, as a consequence, the shares of the company continued to decline in value. Toward the end of his administration the discovery of gold in California occasioned a sudden revival of business, as for a brief time the Russian possessions in North America were the nearest depot of supplies. A few cargoes of shop-worn, unsalable goods that had blocked up the warehouses of the company for decades were disposed of at San Francisco at immense profit, and a lucrative trade was inaugurated in salt fish and lumber. An attempt was also made by the company to engage in mining in California on its own account, an official with a force of Aleutian laborers being sent to the mines, where he took up a claim, but after obtaining a few ounces of the precious metal his Aleutians left him to take up claims of their own. Finding themselves baffled in this enterprise the directors of the company dispatched an experienced mining engineer, a graduate of the college of mines in St. Petersburg, to Sitka, with orders to prospect for precious minerals in the colonies. This man, Lieutenant Doroshin, began his explorations in 1849. He discovered gold in the vicinity of Cook Inlet and collected several

ounces in dust, but this was the result of the labor of forty men for nearly a year at great expense; and upon the recommendation of Doroshin these experiments were abandoned.

The existence of coal in the southern portion of the Kenai Peninsula had been known for many years, and occasionally a small quantity of the mineral had been extracted for use in the Sitka shipyard and on the tug boats and small steamers of the company. The discovery of gold in California, however, gave a new impetus to this industry. Experienced miners and engineers were imported from Russia and Germany, and a large force of men was employed in opening the coal veins at English Bay, or Graham Harbor.

The prosecution of this enterprise required a large amount of capital, which the shareholders of the Russian-American Company were unwilling or unable to furnish, but by this time the development of California had created a demand for coal, and it was not difficult to find men willing to engage in such a venture at San Francisco. A company was formed, consisting of several American merchants of San Francisco and the Russian-American Company, represented by their resident agent in San Francisco, Mr. Kostrometinof. Arrangements were made for the shipment of machinery, pump and hoisting works from the Eastern States, the Russian-American Company furnishing the necessary capital for preliminary expenses. The San Francisco partners of the new firm, which was subsequently named the American-Russian Company, suggested that shipments of ice from Alaska to San Francisco be included in the operations of the firm, and the Russian company began the construction of ice houses and wharves at Sitka, and subsequently on Wood Island, near Kadiak.

In the spring of 1851 Lieutenant Barnard, a member of Captain Collinson's Franklin Search Expedition, proceeded to Nulato in search of information with regard to the fate of Sir John Franklin, and having traced certain rumors of the presence of white men in the far interior to the Koyukuk tribe, he expressed his determination to send for the principal chief of that tribe, who was then participating in the celebration of an annual festival about 25 miles from Nulato. The chief in question was the most wealthy and influential in the whole region, and, being possessed of an exaggerated opinion of his own importance, took offense at the English officer's expression. The Russian traders who had lived for years at the isolated station of Nulato, and were much at the mercy of the surrounding warlike tribes, had always respectfully invited him to the fort whenever they desired his presence. His Indian pride rose at the insult, and a council of warriors was called; the shamans were also consulted, and it was finally concluded that all the Indians assembled should proceed to Nulato and demand satisfaction for the alleged insult. At this time a Russian employee of the company, accompanied by one man, arrived on the spot, having been instructed to induce the chief to meet Lieutenant Barnard at Nulato. As soon as his errand was known the man was doomed, and he was approached from behind while seated on his sled and instantly killed with a lance. The Indian companion of the murdered trader was also killed. Immediately after committing this crime the warriors prepared for action and set out for Nulato. Only half a mile from the trading post was situated the native village of that name, containing about 100 people. The Indian slain by the Koyukuks belonged to this village, and, in order to forestall retaliation, the invaders surprised the inmates in their houses, killing all with the exception of a few women and children. This was done so quietly that the Russians and their visitors at the station were not aroused. When the bloodthirsty savages finally reached the stockade they found the commander, Deriabin, who had just arisen, sitting behind one of the houses. He was approached stealthily from behind and stabbed in the back, dying immediately, without giving the alarm, and over his body the party entered the house where Lieutenant Barnard was reading.

At the sight of the infuriated Indians the English officer seized a gun and fired twice without hitting anyone, and a notorious shaman, named Larion by the Russians, then stabbed the lieutenant in the abdomen, inflicting a mortal wound. The Indians next turned their attention to the barracks, where the laborers lived with their native wives, but a few shots fired by the besieged induced them to retreat with the prisoners made in the village. The murderous shaman had been wounded in the melee, but managed to make his escape, and lived until a few years ago, both feared and hated by whites and Indians, committing many horrible crimes and frequently

inciting others to murder. Lieutenant Barnard was buried within a few yards of the stockade of Nulato, and a cross was erected over his grave by Surgeon Adams, royal navy, with the inscription: "Lieut. J. J. Barnard, of Her Majesty's *Enterprise*, killed February 16, 1851, by the Koyukuk Indians.—F. A." The cross has since been painted at various times by traders stationed at Nulato, and the inscription has disappeared. When I visited the spot in the summer of 1880 the simple monument was still standing, with a new coat of sky-blue paint, and to the right and left were two other graves of victims of murderous Indians in the vicinity.

In 1851 Tebenkof was relieved by Captain Rosenberg as chief manager of the colony. The latter continued to carry out the terms of the company's agreement with its San Francisco partners in the coal and ice business, but a suspension of all traffic was threatened by the outbreak of the Crimean war, involving the danger of an attack upon the Russian colonies by English cruisers. As soon as war was declared the representatives of the Russian-American Company and the Hudson Bay Company met in London and drew up a mutual agreement of neutrality as long as the war should last; no armed vessel and no land force larger than was needed for the purpose of local protection was to be maintained in either colony, and intercolonial traffic was to be carried on as usual, with one exception, this concerning the piece of land rented by the Hudson Bay Company from its Russian neighbors. The rental for this was commuted from 2,000 land-otter skins to a fixed sum of £1,500 per annum. The Hudson Bay Company was also temporarily released from its obligation to ship provisions to Sitka on its vessels.

The Russian possessions on the northwest coast of America remained undisturbed throughout the war, though a few ships of the company were captured by English cruisers, one of them, the *Sitka*, falling into the enemy's hands at the end of a successful voyage around the globe, having escaped the notice of all the English squadrons then scouring the oceans, until in the vicinity of the Kamchatka coast she was hailed by a frigate and obliged to surrender. On the Asiatic coast several encounters took place between the Russians and the allied fleet, among them the famous unsuccessful attack of the joint French and English squadrons upon the harbor of Petropavlovsk.

Rosenberg, whose transactions as chief manager were confined within very narrow limits by the war, was relieved in 1854 by Captain Voievodsky, under whose administration the lease of the territory to the Hudson Bay Company was again extended for ten years, upon terms similar to those of the first agreement. In the year 1855 the Kolosh Indians, located in the immediate vicinity of Sitka, gave evidence of an unruly spirit, and toward the end of the year two savages who were prevented from stealing wood by a sentry wounded him with a spear. The chief manager demanded a surrender of the guilty parties, but this demand was met with threats. A few shots were fired from a cannon over the village, but the only effect was a swarming of armed warriors from all the huts and hovels, who rushed upon the fortified inclosure of the settlement and began to cut down the palisade with axes. Fire was then opened upon the savages by all the batteries and blockhouses, and was rapidly returned by the savages. The latter obtained possession of a chapel built of stout logs for the accommodation of the natives and converted it into a stronghold from which they could command with rifles nearly all the Russian batteries. During the first day they did considerable execution in picking off officers and men as they hurried to their stations; but on the following day a regular bombardment of the native village took place, and after two hours the Indians ceased firing, declaring themselves willing to treat. The most profuse professions of friendship for the Russians were made by the savages and good behavior promised for all future time, and after the assailants of the sentry had been surrendered for punishment Voievodsky agreed to pardon the attack. During the action 2 Russians were killed and 19 wounded, the Kolosh losing 60 in killed and wounded. A report of the transaction to the Imperial Government resulted in an expression of thanks by the Emperor to Captain Voievodsky.

Lieutenant Baranof, of the Siberian Line Battalion stationed at Sitka, who had been wounded, received the order of St. Anne of the fourth class; and one gold and four silver medals, with the inscription "For bravery," were bestowed upon soldiers who had distinguished themselves on the occasion.

The American whalers frequenting Bering Sea previous to entering the Arctic through Bering Strait had frequently been the object of complaint to the Russian Government by the Russian-American Company. It was claimed that these whalers made a practice of landing on the Aleutian Islands to try out blubber, and that the offensive smoke and stench resulting from this operation had the effect of driving away the precious sea otter from the coast. In 1842 Chief Manager Etholin reported that in his tour of inspection throughout the colonies he had encountered several American whalers close inland, but that they refused to answer his questions or to obey his orders to leave the Russian waters. Some of the whalers learned that in 1841 fifty ships from New Bedford and Boston had been in the vicinity, and that they had succeeded in capturing from ten to fifteen whales each. From 1842 these complaints concerning the whalers were renewed every year, and during Tebenkof's administration he proposed to the company to go into the whaling business in the waters of Bering Sea and the north Pacific as the best means of keeping out foreigners. His plan was to hunt whales in boats only from the harbors of the Aleutian Islands, and to engage at first a number of American harpooners and steersmen until they and the Aleutians had been sufficiently trained to do the work.

Under the terms of the treaty with England and America no vessel of either of those two nations was allowed to hunt or fish within 3 marine leagues of the shore, but as there was no armed Government craft in the colonies the provisions of the treaty were totally disregarded by the whalers, until at last the company proposed to the Imperial Government that if a cruiser were sent out from Russia to guard the colonial coast against intruders the company would bear the expenses of such a vessel. The Emperor agreed to the proposal, and gave orders to the naval authorities to prepare estimates as to cost and expenditure. In reply a report was received stating that the sum of 270,000 rubles was required to fit out the ship for the cruise, and 85,000 rubles annually for its maintenance. This sum the company found itself unable to pay and the project fell through. At last, in 1850, the corvette *Olivitza* was ordered to the Sea of Okhotsk, and did some service in keeping foreign whalers out of that sea and breaking up their principal station near the Shanta Islands. In the meantime Tebenkof's suggestions concerning the fostering of Russian whaling interests in the Pacific had borne some fruit, a few of the shareholders of the Russian-American Company, together with some shipowners in Finland, concluding to fit out whaling ships in Finland or at Cronstadt and send them around into the waters of Bering Sea and the Arctic beyond the straits. A capital of 100,000 rubles was quickly contributed, and active operations began as early as 1849. By order of the Emperor a sum of 20,000 rubles was appropriated from the special fund of the Province of Finland to aid in the construction of the first whaling ship, and a sum of 10,000 rubles to be paid the company for the construction of each succeeding ship of the same class. The company also obtained the privilege of importing free of duty all the material necessary for building and fitting out the first 12 ships and to carry on the business without payment of duties for a period of twelve years. The name of this branch company was the "Russian-Finland Whaling Company," and its charter was approved on the 13th of December, 1850.

The first ship, the *Suomi*, of 500 tons, was burned in the port of Åbo, Finland, in the year 1851. The command of the vessel was intrusted to a German captain, Hagshagen, and a crew of thirty-six men was engaged, which consisted principally of foreigners, among them three steersmen, three harpooners, and three coopers. The whaleboats had been imported from New Bedford. The cruise of the *Suomi* in the Okhotsk Sea in the year 1852–53 was very successful, the catch being 1,500 barrels of oil and 21,400 pounds of whalebone. The cargo was sold on the Sandwich Islands, realizing 88,000 rubles, a sum that covered the price of constructing the vessel and fitting it out, and left a clear profit of 13,000 rubles. Unfortunately the war with England and France broke out about that time and interfered with further operations in this line.

The *Suomi* had sailed for home before the news of the war reached the Sandwich Islands, and consequently knew nothing of the circumstances when she made the first port on the English coast. The pilot came off and, strange to say, warned the captain of his danger and gave him an opportunity to make his escape to Bremen. The presence of French and English cruisers in the channel made it necessary to sell the ship at Bremen for the comparatively small sum of 21,000 rubles.

The second whale ship dispatched by the new company was the *Turko*, which left for the Okhotsk Sea in 1852, having been fitted out altogether at Åbo. The captain was a German by the name of Schäle, and the crew consisted of 25 Finlanders, many of whom had served on American whaling voyages. A cargo of goods for the Russian-American Company was also forwarded on this ship; but by various disasters the vessel was delayed and did not arrive at Sitka until late in 1853. Shortly before reaching port a few whales were killed, 150 barrels of oil and 650 pounds of whalebone being secured.

Early in the following spring the ship proceeded to sea under command of the first mate, Sederblom, the captain being disabled by disease. The voyage was very successful, resulting in a catch of 1,700 barrels of oil and 23,000 pounds of whalebone.

During the siege by the Anglo-French fleet the *Turko* was in the harbor of Petropavlovsk, but succeeded in making her escape, discharging her valuable cargo at Kadiak for safe-keeping, and finally reached Sitka, where she remained safely until the end of the war.

The third whale ship dispatched to the north Pacific from Finland was the Aian, 540 tons. She was commanded by a Finlander, Captain Enderg, and reached the sea of Okhotsk in 1854. The catch during the first year was not great, and in the spring of 1855 the naval commander of Kamchatka ordered the captain to land his cargo and to transport the families of officers and soldiers from Petropavlovsk to the Amoor, and during this voyage the ship was captured by an English frigate and burned. At the end of the war the whaling company discovered that, though no actual loss had been incurred, the profits of the business were not what they had expected, and the subsequent operations do not seem to have been pushed with energy or vigor.

A few more ships were fitted out, but as soon as they returned with their cargoes of oil and bone they were sold for whatever price they would bring. It was perhaps unfortunate for the interests of the Russian whaling industry in the north Pacific that the company engaged in the business was so closely connected with the Russian-American Company, which was then becoming more deeply embarrassed every year.

Under Captain Voievodsky's administration the affairs of the Russian-American colonies were managed very much in the same way as under his predecessors—with the same extravagant display of colonial government and useless experiments in mining, agriculture, and shipbuilding which characterized the five years immediately preceding the expiration of the third term of the company's privileges. The corporation was deeply in debt, and, though desirous of continuing the business, endeavored to transfer to the Government the expense of maintaining its authority in the colonies.

The imperial cabinet was both unwilling and unable to accede to the proposition, as the country had just emerged from a disastrous and expensive war, and thus the grant of another charter was postponed from year to year. In the meantime several Government officers were intrusted with a thorough inspection of the condition of the colonies and the company's affairs. Private Councilor Kostlivtzof and Captain Golovin compiled voluminous reports on the subject, and committees of the imperial senate and ministerium of commerce deliberated upon the vexed questions for years. Their reports were very conflicting, and it seemed next to impossible to reconcile the interests of both the Government and the company by any arrangement the various committees could devise.

Voievodsky had been relieved in 1859 by Captain Furuhelm, but the company refused to select a successor to the latter until the new charter should be granted. In the meantime the first negotiations for a sale of the Russian possessions on the American coast were inaugurated privately in the year 1864. It is said that the first offer was made to England, although the American Government was approached on the subject early in 1864; but the matter was temporarily dropped on account of the civil war then raging.

With the establishment of peace in the United States the subject was taken up again by the Russian ambassador and Secretary Seward. San Francisco merchants, among them the members of the American-Russian (so called) Ice Company, were among the most active promoters of this scheme, the latter firm expecting to succeed the Russian-American Company in their fur trade and other branches of business. Upon the refusal of the company to appoint a new chief manager,

the Emperor of Russia had sent out Prince Maksutof, a naval officer of Tartar extraction, who administered the colonies under the title of military governor. He was, however, subsequently invested by the American-Russian Company with the powers of a plenipotentiary agent, and finally assumed the whole management of its affairs in winding up the general business and transferring its property.

In 1865 the managers of the Western Union Telegraph Company conceived a plan for constructing a line of telegraph to connect the new world and the old by means of a cable via Bering Strait. The project was first directed by Mr. P. McD. Collins, who obtained the necessary charters from the British and Russian Governments. Colonel Bulkley, of the United States Army, was appointed chief engineer of the enterprise, and, after making arrangements for work in British Columbia, went to Sitka in the U. S. S. *Shubrick*, which had been placed at the service of the Western Union Company by the Government. Here Colonel Bulkley found his advent quite unexpected, but the governor, Prince Maksutof, expressed readiness to afford every assistance in his power, giving the assurance that the natives would be friendly to the enterprise if properly approached. Some of the Thlinket chiefs were then at Sitka, but Maksutof thought it best to defer negotiations, probably because he had no instructions from his Government. During the same year, in the month of July, an exploring party of the telegraph company, commanded by Robert Kennicott, was landed at St. Michael, Norton Sound, by the bark *Golden Gate*, belonging to the Western Union Telegraph Company. The party was provided with a small stern-wheel steamer, the *Wilder*. Mr. Kennicott had previously explored the headwaters of the Yukon in connection with a journey through British North America, but the other members of the expedition were new to the country, though they have since become most intimately connected with scientific and mercantile enterprises in the territory. Among them may be mentioned Mr. Ketcham, Mr. Whimper (artist), Mr. William H. Dall, Mr. F. M. Smith, and Mr. Francis, the engineer of the little steamer. Preparatory arrangements for the work of constructing a telegraph line began at once, with the assistance of Stephanof, who was then the Russian commander at St. Michael.

During the winter a portion of the telegraph party proceeded up the Yukon River and located at Nulato. The winter was passed in active explorations, but the approach of spring was marked by a sad calamity. The talented and energetic director of the Western Union scientific corps, Robert Kennicott, was found dead on the bank of the river on the 13th of May, 1866. On the day before he had saved the life of a Russian whose canoe had been caught between cakes of ice. In the morning he was missing at breakfast, and his friends, becoming alarmed, searched and found him lying dead about half a mile from the fort, an open compass lying near him, and figures in the sand showed that he was making a calculation at the moment of his death. He had been suffering from heart disease, aggravated by exposure and anxiety.

Mr. William H. Dall was subsequently appointed Kennicott's successor, and the explorations were continued by him alone. The completion of the trans-Atlantic cable put an end to the enterprise as far as the Western Union Company was concerned, and all its various detachments already in the field in the wilds of Alaska and Siberia were recalled at once.

In the same year (1866) the legislature of Washington Territory forwarded a petition to Washington requesting the United States Government to obtain from the Emperor of Russia such rights and privileges as would enable American fishing vessels to visit the ports and harbors of the Russian possessions. As negotiations for the purchase of the territory were already in progress no further notice was taken of this special request.

Early in 1867 a surveying party, under command of Prof. George Davidson, United States Coast Survey, was dispatched from San Francisco by the U. S. S. *Lincoln*, arriving at Sitka August 11, and returning late in November.

After long debates in Congress, both in the Senate and House of Representatives, still fresh in our memory, the treaty with Russia for the cession of the present Territory of Alaska to the United States was finally passed and the necessary appropriation of $7,200,000 made. The opposition to the measure was strong and fierce, and its success was almost wholly due to the efforts of Secretary Seward and Senator Sumner.

In the month of May, 1867, the treaty was signed, and on the 18th of October of the same year the ceremony of final transfer of the Territory took place at Sitka. Both American and Russian troops were drawn up in line, General Rousseau acting as commissioner for the United States, Prince Maksutof occupying the same position for the Russian Government. With the roll of drums and the discharge of musketry the imperial eagle of Russia descended and the stars and stripes rose into the murky atmosphere of an Alaskan autumn day. The Princess Maksutof wept at the spectacle, and all nature seemed to keep her company, drenching to the skin all the participants in the ceremony. The native Indians in their canoes witnessed it from a distance, listening stolidly to the booming of cannon and gazing with indifference upon the descending and ascending flags. Of the nature of the proceedings they had a faint and imperfect conception, but one thing they did realize—that the country they once imagined their own was now being transferred to a strange people by what must have appeared to them a singular ceremony.

The new acquisition was looked upon as an "Indian country," and a military commander was placed in charge, Gen. Jefferson C. Davis being appointed commander of the new department, with headquarters at Sitka. The garrison consisted of one company of artillery and one company of infantry, numbering together perhaps 250 men.

A number of business men had accompanied or preceded the commissioners of the two governments, and the American flag was scarcely floating from the top of the flagstaff before new shops were opened, vacant lots covered with the framework of shanties, and negotiations entered into for the purchase of houses, furs, and other property of the old Russian company, and in less than a week new stores had been erected, and two ten-pin alleys, two drinking saloons, and a restaurant were opened.

Sitka, the town that for two-thirds of a century had known nothing beyond the dull, unchanging routine of labor, and a scanty supply of necessaries at prices fixed by a corporate body 8,000 or 10,000 miles away, was profoundly startled even by this small ripple of innovation. To the new American domain flocked a herd of men of all sorts and conditions, Alaskan pioneers and squatters, and aspirants for political honors and emoluments in the new Territory. Before the first sunset gun was fired preemption stakes dotted the ground, and the air was full of rumors of framing a "city charter," creating laws and remunerative offices; and it was not long before an election was held for town officers, at which over 100 votes were polled for nearly as many candidates. The Russian population looked with wonder upon this new activity. The families of the higher officials, as well as those of the farmer and laboring classes, opened their houses to the newcomers with true Russian hospitality; but unfortunately they did not discriminate, treating officers, merchants, and soldiers alike, and in many instances their kindness was shamefully abused. Robberies and assaults were the order of the day, or rather of the night, until the peaceable inhabitants were compelled to lock their doors at nightfall, not daring to move about until the bugles sounded in the morning.

A number of representatives of wealthy firms and corporations had started upon a race from San Francisco or the Sandwich Islands to secure the property and good-will of the Russian-American Company. Mr. H. M. Hutchinson, representative of the firm of Hutchinson, Kohl & Co., was the successful competitor, he having completed his bargain with Prince Maksutof even before the agent of the American-Russian or Ice Company, the previous partners of the Russians, had been able to present his claims.

The Russian-American Company was allowed two years in which to settle its affairs and to transport all the Russian subjects who wished to return. For this purpose all its employees distributed through the territory were collected at Sitka, and from the time of the transfer to 1869 nearly 1,000 of them were living there; and to these between $40,000 and $50,000 were paid every month as salaries, which being regularly spent before the next pay day, made business decidedly brisk. In addition to these Russians there were two companies of soldiers and a few hundred American and other traders, while a man-of-war and a revenue cutter were always in the harbor, yielding a golden harvest to business men and saloon keepers. At this time high hopes of Alaska's future prosperity were entertained. The Western Union Telegraph enterprise, before its abandonment, had pushed its wires to Columbia, to Fort Stager, on the Skeena River,

in 53° 30′. This brought the telegraph within 350 miles of Sitka, but at present the nearest telegraph office is at Victoria, Vancouver Island, 900 miles away.

Difficulties with the Indians in southeastern Alaska began at an early day under the new government. The last acts of hostility committed by the Kolosh of that vicinity had occurred in 1864, when an English vessel called the *Royal Charlie* was boarded by the Kekh Indians and the entire crew slaughtered. The Russian authorities took no notice of the affair whatever, because the English craft had no right to trade in those waters, and the offenders remained unpunished.

In December, 1867, the first trouble occurred at Sitka. A sentry of the garrison observed some Indians after nightfall with a light in the vicinity of the powder magazine, and, hailing them without receiving an answer, he fired, wounding one of the number. The remainder decamped, but the next day a demand was made by the chief for compensation for the injuries sustained by the wounded man. General Davis refused to comply with the request, whereupon the chief returned to the village and hoisted the English flag. Davis sent a messenger to notify the chief that if the foreign flag was not removed by daylight on the following day he would bombard the village; and when day dawned the rays of the sun illuminated the stars and stripes in place of the cross of St. George, but the Indians were surly for some time after the occurrence, threatening an outbreak occasionally.

As early as the 1st of March, 1868, a newspaper appeared in San Francisco under the name of the Alaska Herald. It was published by a runaway monk of the Greek Church, who had never seen Alaska, but who imagined that he was called upon to declare himself a champion of the former Russian possessions. A few columns of this sheet were published in the Russian language, and the most absurd proclamations addressed to the people of Alaska were circulated among its readers, and for some time its publisher succeeded in sowing the seeds of discord and dissatisfaction among the new Russian-speaking citizens of the United States by telling them that as Americans they were all entitled at once to 160 acres of land, and that they must not labor for less compensation than $5 a day in gold, declaring with the greatest effrontery that the Constitution of the United States so provided.

In the meantime military garrisons were dispatched to other points in the territory and located among peaceable tribes, where even the first discoverers had never found it necessary to make a display of force. A battery of artillery was stationed on the island of Kadiak, and another command from the same regiment sailed from Washington Territory in June, 1868, to establish a military post on Cook Inlet. The spot to be selected had not been definitely indicated on the charts, and while attempting to find the proper place a ship was wrecked upon a rock on July 16, at the mouth of what is now called English Bay or Graham Harbor; no lives were lost, but nothing else was saved. After suffering much hardship the wrecked soldiers were rescued in the month of August by the steamer Fideliter and taken to Kadiak. For many years following the natives of the vicinity had ample supplies of millitary clothing, rifles, and other stores cast up by the sea.

The first American vessel that visited the seal islands was owned by the firm of Williams & Haven, of New London. The agent and commander landed on St. Paul Island on the 13th of April, 1868, and on the 2d of September sailed for the Sandwich Islands with a rich cargo of seal skins. Disputes arose between this party and the agent of the successors to the Russian-American Company, and the Government found it necessary to station Treasury agents on the island to preserve order and prevent, if possible, an indiscriminate slaughter of seals.

In February, 1868, the first detachment of Russians homeward bound left Sitka, numbering 200, on the ship Tsaritza.

The Indians of the Upper Yukon River and in the vicinity of Nulato gave indications of hostile spirit at the beginning of the year 1868. The epidemic pneumonia was prevalent among them, and their shamans declared to the people that the disease had been imported and spread by the white men. The Rédoute Nulato had previously been the scene of bloody encounters, as in 1851, when Lieutenant Barnard, royal navy, one of the members of the Franklin Search expedition, was killed, as before described. Several murders occurred among these Indians during the

first year of American possession, but the white traders were not attacked, though frequently threatened. In the mean time the military authorities at Sitka continued to have difficulty in the immediate vicinity. It is the time-honored custom of the Thinklet to demand payment in money or goods for the death or injury of a member of the tribe, and failing to receive the desired equivalent they retaliate with violence.

On the 1st of January, 1869, the chief of the Chilkat tribe was on a visit to Sitka with 60 or 70 of his warriors, and paid his respects to General Davis, who made him a present of a few bottles of whisky. The American commander had adopted from the Russians the rule of allowing no Indian inside of the palisades surrounding the settlement between sunset and sunrise. On that day the visitors began to feel the influence of the whisky, and both the Sitka and the Chilkat chiefs refused to retire, and snatched the gun from the sentry who endeavored to enforce the order. The Sitka chief was immediately arrested, but on attempting to seize the other chief the soldiers were met by an armed body of Indians, and in the mêlée the Sitka chief was knocked down and one of the soldiers was wounded, when both parties retreated. On the following morning the Sitkans came to the fort with a flag of truce, requesting an audience with General Davis, declaring that they desired peace and protection. A messenger was sent to demand the immediate surrender of the Chilkat chief, and, when he refused to come, orders were given to shell the house in which he was staying. The troops were all under arms, guns double shotted, and citizens prepared for defense. The vessels of war in the harbor had orders to prevent the escape of Indians from the village, but during the following forenoon several canoes put off from the beach and were fired into from the *Saginaw*. One canoe was sunk and three of the inmates killed, one belonging to the Sitka, one to the Chilkat, and one to the Kehk tribe. Obtaining no payment, the Kehks killed two white men, prospectors, who had ventured into their country. At the same time a small schooner, the *Louisa Downs*, was wrecked in one of the interior channels, and it was reported that the whole crew had been massacred. General Davis placed a company of troops on board of the U. S. S. *Saginaw* and started from Sitka on the 11th of February. The first village was found to be deserted by all the inhabitants with the exception of one squaw, and the houses were laid in ashes and everything of value destroyed. Subsequently two other villages were found alike deserted and were treated in a similar manner. Not a hostile warrior was seen. Some time later it was discovered that the shipwrecked crew had not been killed, but rescued by these savages and treated kindly. The return to Sitka was delayed only through fear of the natives caused by the bloodless campaign narrated above.

In the month of July of the same year the Chilkat Indians, who had still a life to their credit on account of the trouble in Sitka in the month of January, boarded a small trading vessel and demanded a life or money. A written guarantee for the settlement of the claim was given and the matter reported to the commanding officer at Sitka, who, however, refused to have anything to do with it. Upon this the trader who had given the security paid the claim, thus securing peace to the country, and after this the Indians submitted to the general's demands.

On the 29th of April, 1869, the first number of the Sitka Times was published at Sitka, by T. G. Murphy, who combined the avocations of tailor, lawyer, and editor. The little sheet was the organ of an aspirant for gubernatorial honors, through whose efforts the city government was organized in Sitka, with W. S. Dodge as mayor. The new government labored under difficulties, being confronted at every step with military orders threatening arrest and confinement in the guardhouse. A truce between the contending powers was observed during the visit of Secretary Seward, in the month of July, 1869, who came to view the purchase so intimately connected with his name. Congratulatory speeches were exchanged between Mr. Seward, the military commander, and the "mayor and board of aldermen." But the Russian church was robbed of some richly jeweled paraphernalia of worship, and minor thefts were of common occurrence. Among the officers wordy disputes were frequent, and one duel was fought with fatal result.

General Thomas, who was then in command of the military division of the Pacific, made a

tour of inspection throughout the territory, and after careful investigation of the state of affairs deemed it wise to abandon all military posts in Alaska with the exception of that at Sitka.

The year was not to end, however, without additional difficulties with the Indians of southeastern Alaska. An occurrence took place at Fort Wrangell which delayed the abandonment of that post for some time. Some white miners passing the winter at that place had sold liquor to the Indians about the fort, and one of the drunken savages beat his squaw until the blood rushed from her mouth. The post trader, Leon Smith, interfered and had the woman carried into the house of one of the laundresses of the garrison. The brutal husband then feigned regret for the ill treatment of his wife, and offered to shake the hands of the laundress who had protected her. During this friendly ceremony he suddenly seized one of the woman's fingers in his mouth and bit it off, and then fled for the Indian village. A detachment of soldiers was sent to arrest him, but the Indians displayed considerable hostility. The trader Smith then set out for the village, hoping to pacify the savages, but after advancing a few steps he was shot down. After considerable delay, and bombardment of the Indian village from the garrison, the murderer was delivered, tried by court-martial, and hanged, the chief of the tribe acquiescing in the sentence.

In the spring of 1870 another murder was committed at Sitka by a soldier who had been dishonorably discharged. This man, William Bird, had a grudge against the commander of his company, and meeting him in a saloon he drew his pistol, threatening to kill him. The officer struck at Bird and pushed him out of the door; the man then fired through the door, instantly killing a lieutenant of the revenue service who happened to be standing in range. The murderer, though threatened with mob law, was secured by the guards, and subsequently repeatedly tried in military and civil courts at Sitka, Portland, Oreg., and San Francisco, but was finally released on account of conflicting rulings concerning jurisdiction.

In the summer of 1870 the organ of the tailor journalist was removed from Sitka to Seattle, Wash., and shortly after passed out of existence. This event, unimportant as it seemed in itself, marks the end of the brief period of sudden rise and fall of commercial prosperity in Sitka. The causes instrumental in creating a temporary bustle and hopeful feeling in business circles have been explained above; but when one ship after another took the Russians away to their native country, the flow of cash from their pockets ceased; the garrison was being continually reduced in numbers, and in 1870 business was dead. There remained about 60 soldiers, about 200 Russian half-breeds of the lowest order, and a few Americans, and the town which had once held nearly a thousand Russians, the governor with a large retinue of officers and officials, a bishop with his train of priests, and which then was the scene of gay society life, was now almost deserted. The people who had been so sanguine of success, saying that the fisheries, the fur trade, the timber, and the minerals needed but American enterprise to yield fortunes, had been singularly blind as to the real cause of this spasmodic prosperity of Sitka, and but few could understand that the resources of a northern country are few and slow to develop.

During the year 1870 the western military garrisons were withdrawn, and the substantial buildings erected at great expense of labor and money were abandoned. It would be difficult to point to a single benefit conferred upon the people of those regions by the temporary sojourn among them of the military forces. A small detachment of soldiers had also been stationed on the seal islands to enforce such regulations as had then been promulgated by the Treasury Department for the protection of both sealers and seals. This measure benefited only the soldiers themselves, who were employed by the traders in killing and skinning the seals, and in this way assisted in the threatened extermination rather than in the protection of these animals. Fortunately for the existence of the valuable fur-seal industry, the Government about this time hit upon the only practical plan to preserve the animals from destruction. The islands were declared a Treasury reservation, and by an act of Congress approved July 1, 1870, the islands of St. Paul and St. George were leased for a term of twenty years to a corporate company. The lease was awarded to the highest bidder, the Alaska Commercial Company, located at San Francisco; and since that time all danger of extermination or a decrease in the number of the seals has been averted, and, in fact, at present a steady, gradual increase can be observed.

During the brief period of prosperity, between September, 1867, and August, 1869, the arrivals of vessels at Sitka were 71, with an aggregate tonnage of 13,339, the departures during the same time being 67, with an aggregate tonnage of 12,371; but from that time forward the shipping of the port was confined almost entirely to the monthly mail steamer, the only means of communication between Sitka and Washington Territory, and all intercourse between Sitka and the western portion of Alaska was absolutely at an end.

In 1872 another difficulty with the Sitka Indians occurred, originating in a fight between a soldier and an Indian. In the fracas ensuing three Indians were wounded and an attack upon the garrison was threatened. The affair was settled, however, without additional bloodshed. The garrisons at Sitka and Wrangell are still maintained, but on the 5th of February, 1873, the last mayor of Sitka, George A. Edes, resigned, and the "council" held its last meeting on February 18 of the same year. As the functions of these officers had been exceedingly limited, no social revolution followed this event, and matters went on much as usual under military rule.

In the beginning of the year 1874 the garrison at Wrangell was withdrawn, but owing to disorder among the natives it was reestablished the following year.

In the year 1874 an attempt was also made to colonize Alaska with Icelanders, who were then leaving their own country in large numbers, and two of these people were taken to Alaska on a United States man-of-war, and given every opportunity to view the country. They were pleased with what they saw, declaring that the Kadiak Archipelago and the coast of Cook Inlet were far superior in natural resources to their former home, but before their favorable report was in the hands of the Government their people had found more pleasant homes in the Western States and in the British possessions. The Alaska Commercial Company at that time offered to transport a colony of 500 Icelanders to any portion of Alaska free of charge, but unfortunately the offer was not accepted, and the opportunity of securing additional permanent population for at least some portions of Alaska passed by. During the same year four miners from the Cassiar "diggings," in British Columbia, made their way to the head waters of the Yukon, and descended that stream. They discovered small "prospects" of gold in a few localities, but found it more profitable to engage in the fur trade, in which pursuit they still continue.

During the years following several bills were introduced in Congress looking to the establishment of some sort of civil authority in Alaska, one of them being to make it a county of Washington Territory, and another to annex the country to Washington Territory altogether. All the various measures proposed fell through without action on the part of Congress until 1877, when the troops were finally withdrawn.

In 1878 the Sitka Indians began to comport themselves in the most insolent manner; defacing the graves in the Russian cemetery, pulling down the stockade separating the town from the Indian settlement, and committing other similar outrages. At that time not even a revenue cutter was present in the harbor, and the inhabitants becoming very much alarmed sent an appeal for immediate protection to the commander of an English man-of-war in the harbor of Victoria. The assistance was promptly rendered, just in time, it was claimed, to prevent disaster; opinions on that subject were, however, divided. In due time the English man-of-war was relieved by a similar vessel of the United States Navy, and since that time a vessel of that class has been constantly stationed in the harbor of Sitka, affording protection and assisting the inhabitants of southeastern Alaska in various ways.

Ledges of gold-bearing quartz had been discovered in the vicinity of Sitka before the removal of the troops, but considerable difficulty was encountered in securing the necessary capital to open the mines; but finally some capitalists in Portland, Oreg., formed a company, and for a time the prospects of Sitka were once more brightened. A stamp mill was erected, but, though numbers of other claims were located and opened, the ore existing here was found to be of a very low grade, and would not even pay for the most economical mode of working. For years the enterprise was kept up in the constant hope of "strikes" of better ore, but at present the Sitka quartz mines are practically abandoned. On the coast of the mainland in the vicinity of Wrangell a surface-mining camp of small extent has been in existence for several years, yielding a small profit to two or three proprietors of the claims. The most promising discovery of the kind was

made at the end of the season of 1880 on the coast between Takoo and Chilkhat inlets. The gold found here is said to exist both on the surface and in quartz veins, and rich specimens were forwarded to Portland and San Francisco, resulting in a rush of miners and speculators during the spring of 1881, and a town sprang up which has boasted of three names during its brief existence—Harrisburg, Rockville, and Juneau City. The mail service was extended to this place, and shipments of bullion were actually made, the exact value of which can not be ascertained. Of the value of this discovery it is impossible to judge at such an early date, but upon its success depends the development of at least this section of Alaska in the immediate future. In the meantime, in the absence of all legislation on the subject, Alaska remains, as it has been, an abnormal appendage to our States and Territories—not a Territory even in name—only a district for the collection of customs.

Notes on Alaskan Ethnology.

The native tribes of Alaska offer a vast field for the labors of students of North American ethnology. Thus far they have only been roughly grouped in families and tribes by various writers, many of whom, possessing no personal knowledge of the subject, have built up theories from the notes of incompetent and casual observers. As an instance of this we may cite that casual remarks of travelers on the facial similarity existing between certain Aleutian individuals and the Japanese resulted in the positive and reiterated assertion by scientific writers that the former migrated to their present homes from eastern Asia—a theory now thoroughly exploded by recent authorities.

Our knowledge of the distribution and classification of the tribes in the extreme northwest is still very limited, and years of careful investigation will be required to enable us to arrive at any satisfactory result and to attain to any degree of accuracy. Some fragmentary ethnological material from Russian America has been furnished in times past by Russian and German writers; Veniaminof, Davidof, Zagoskin, Wehrman, Baer, Wrangell, Holmberg, and others have given to the scientific world valuable contributions on this subject. Veniaminof (who died but a few years ago in Moscow as the metropolite or primate of the Russian Church) was one of the most reliable and painstaking investigators, but his personal observations were limited to the Aleutian Islands and the Alexander Archipelago. Davidof, an officer of the Russian navy, visited the island of Kadiak and the adjoining continental coast at the beginning of the present century, and Holmberg also devoted himself chiefly to the Kadiak and Sitka districts. To L. Zagoskin, a lieutenant in the Russian navy, we owe our first definite knowledge of the tribes of Norton Sound and the lower Yukon region. Another naval officer, Lieutenant Wehrman, compiled in 1857 the first map showing in colors the distribution of native tribes in Russian America, a map quite accurate in its main features. Next in order is the manuscript map, also in colors, compiled by Dr. George Gibbs from information obtained from the Russian authorities at Sitka.

Since the purchase of Alaska by the United States the most valuable contributions to its ethnology thus far published have come from the pen of Mr. William H. Dall, of the United States Coast and Geodetic Survey, who also compiled a map in colors, which was printed with Volume I of Contributions to North American Ethnology. A vast amount of ethnological material relating chiefly to the Yukon Basin, in the extreme northwest, has been collected by Mr. E. W. Nelson, of the United States Signal Service; but this has not yet been given to the public. During repeated and extended journeys in Alaska I have been enabled to glean some fragmentary knowledge of this subject; but until intelligent investigation can be extended systematically over all sections of Alaska and the results carefully compared and sifted the work can not be looked upon as complete.

All that can be done at present in the way of classifying the natives of Alaska is to divide them into four distinct families or tribes, whose habitat and boundaries can be defined with a certain degree of accuracy, subject to future corrections. The numerous subdivisions of each family (based chiefly upon dialectic differentation) can only be vaguely indicated, in the hope of furnishing to future investigators a framework upon which to build a more satisfactory structure.

A comparison of the ethnological map published with this report with those previously compiled at various times will show the gradual acquisition of knowledge on this subject. The differences between the latest map and the one preceding (compiled by Mr. William H. Dall) are slight, and give evidence only of an extension of the field of investigation. This result is all the more gratifying because Mr. Dall and myself have arrived at very similar conclusions through entirely different channels, and without consultation upon the subject. The crude groundwork accomplished earlier by Russian and other writers was, of course, equally accessible to both of us, giving to a certain extent a common base to start from.

The four families or groups now distinguished in Alaska are the Eskimo (or Innuit), the Aleut (Oonángan), the Thlinket, and the Athabaskan (or Tinneh), The first three named occupy the whole coast of Alaska, forming as it were a barrier between the Athabaskan in the interior and the seacoast, except in one instance, where the latter people have succeeded in supplanting the Eskimo on the shores of Cook Inlet. The evidence in favor of ascribing to the Eskimo and to the Aleut a common origin is quite strong, but time and circumstances have wrought such changes in both physical and linguistic features of the Aleut tribes that a distinct classification appears justifiable. For the purposes of this report I have adopted the terms Eskimo and Athabaskan, in lieu of the Innuit and Tinneh of recent writers, purely in the interest of uniformity, and in deference to the action of both the American and British science associations, which have decided that priority must prevail, and that the name first given to a race or tribe in scientific classification must be retained. The terms Innuit and Tinneh represent words in their respective languages, and as such I should prefer them, but I am quite willing to bring a sacrifice upon the altar of uniformity in the work of science. In taking leave of these terms, therefore, I will only mention that *Innuit* was derived from a root signifying *man*, and existing in a majority of the Eskimo dialects. I find this root as *innūk*, *niūk*, *yūk*, *yūt*, *liūt*, and *liūk*; the plural being generally formed in *üng* or *üin*, with a collective form ending in *t*, meaning *people*. It has been suggested that the word *īna*, which signifies *house*, *dwelling*, in nearly all the dialects, has been blended with this root in order to describe a people living in houses, or a settled tribe; but in view of the nomadic habits of the Eskimo this theory is open to doubt.

In the dialect of the easternmost Eskimo tribe on the Pacific coast, the Chugachimute, *ina* designates a *house*, but the word for *people* is *shuīt* or *shvīt* (from *shiūk*, *man*). Zagoskin, whose observations extended over several years, stated that after much questioning of various individuals he arrived at the conclusion that *yugguit* or *yughuīt* was a collective or plural of *man* with the Norton Sound tribes, and that *kangyulit*, *kaniulit*, or *ngyulit* was the general name of all the coast people from the Aretic to the Aliaska Peninsula, and that this term signified *people of one language*. The only evidence in our possession confirmatory of this assertion of Zagoskin is the name of Kangmali Innuĭn, reported by Richardson, and used by Dall as applying to certain tribes on the Arctic coast; to which we may add the fact that with the Bristol Bay and Togiak Eskimo the word *kang* means *the same*. Zagoskin also gives the word *kangakhtuik*, *to speak*.

The word Tinneh in various forms signifies *man* in a majority of the dialects of Alaska, and I find it in the form of *tinné*, *tinne*, *tenna*, *tynnai*, *kinna*, and in the collective *kokhtane*, *khotana*, and *ahtena*.

In discussing these four families or tribes I shall proceed without reference to their relative importance, beginning with the Eskimo.

I. THE ESKIMO (OR INNUIT).

The Eskimo or Innuit, numbering nearly 18,000, inhabit the whole coast line of Alaska west of the one hundred and forty-first meridian, with the exception of the northern part of Cook Inlet, that portion of the Aliaska Peninsula lying west of the one hundred and fifty-seventh meridian, and the Shumagin and Aleutian groups of islands. The origin of the Alaskan Eskimo has been discussed by various authors, most recently by Mr. William H. Dall, in Volume I, Contributions to North American Ethnology, but the only tangible result of such discussion has been the establishment of a general belief that these tribes are of American origin, and that their

appearance on the Alaskan coast probably occurred at the same time with the general migration resulting in the settlement of the inhospitable regions where are now found the eastern or Greenland Eskimo.

For reasons elsewhere explained more at length it appears improbable that the settlement of the Alaskan coast and the islands by the Eskimo could have been effected without the aid of the kaiak, or skin canoe, or at least a craft of similar construction, and consequently it may be presumed that they spread gradually to the westward and southward after having reached the Arctic shore from their original habitations in the interior of our continent; for the present, however, I have nothing to do with this question, the discussion of which rests chiefly upon speculation, and therefore turn to a description of the tribes of Eskimo stock now found in Alaska.

All the Eskimo tribes without exception manufacture and use the covered skin canoe known as the kaiak, identical with that of the eastern or Greenland Eskimo; and this feature is so distinctive and exclusive that a tribal name might justly be based upon it should the necessity arise for another. At present I know of only one instance where an intermixture of the Innuit with another tribe has taken place under such circumstances that the foreign element has gained the upper hand, and there they have already abandoned the manufacture of the kaiak and apparently forgotten the art of its construction. I refer to the Oughalakhmute, who have mixed with the Thlinket. The open skin boat, the *oomiak*, or women's boat, also known as *bidar*, is used by certain tribes on the north coast of Asia; but the kaiak proper is only found among the Eskimo.

When the Russian first observed this craft they applied to it the name of *bidarka*, a diminutive of bidar, a Kamchatkan term for an open skin boat. This term is now used throughout Alaska wherever Russian influence once predominated, and the same word has been incorporated into several Eskimo dialects in the form of *bidali*, which is, however, applied only to two- and three-hatch kaiaks, a variety formerly known only on the Aleutian Islands and adopted by the Russians for greater convenience in hunting and traveling. From Bristol Bay westward and northward the kaiak and the oomiak only are used.

The subdivisions thus far made of the Eskimo tribe inhabiting the Arctic coast are based almost wholly upon locality and dialectic differentiation as reported by traders and whalers who come in contact with them; but for the purpose of classification it would seem sufficient to here use the term Arctic Coast tribes as one subdivision.

The Arctic Coast tribes include Dall's Kopagmute, Kangmaligmute, and Nuwukmute, and all the coast villages down to Cape Krusenstern.

In their mode of life all the people living on the coast between the British boundary and Kotzebue Sound are very much alike. Some settlements are inhabited chiefly by whale hunters, while at others much time is devoted to the pursuit of reindeer, each industry engendering different habits and customs; but they all have subterranean winter houses and skin-covered tents for summer use. Though they have been in contact with whites directly and indirectly for nearly a century there are still found in use among them many implements fashioned of stone, ivory, and bone; and they still consume much of their fish, seal and walrus meat, and blubber in a raw state. But a remarkable contrast to their primitive condition is furnished by specimens of carvings, chiefly masks and human figures, deposited in the National Museum by Mr. E. W. Nelson, many of which may justly be classed as artistic sculpture. A large amount of ready-made clothing finds its way into the hands of these people, who wear it in the summer, but the excessive cold of winter compels them to resume the fur garments formerly in general use among them. The heavy parkee of reindeer, wolf, or dog skin is the outside garment worn by both sexes; undergarments are generally fashioned of the tanned skins of reindeer, or of hair seal and fox skins, the latter being used for trimming; and the high boots worn by both sexes are made of hair seal and reindeer skins.

Of the tribal organization of these people but little is known, but there seems to be no recognized chieftainship, each isolated settlement generally containing one man who makes himself prominent by superintending all intercourse and traffic with visitors. The profits

accruing to him from this position give him some slight influence among his people; but the *oomailik* (*oomialik* of Zagoskin), as these middlemen or spokesmen are called, possess no authority over the people of their village, who pay far more attention to the advice or threats of sorcerers, shamans, or "medicine men." In the festivals, consisting of feasting, singing, and dancing, with which these hyperboreans while away the long winter nights, the shamans also play a prominent part, directing the order of the performances and the manufacture of masks, costumes, etc., while the oomailik or spokesman sinks back into insignificance for the time being.

During the brief summer a large proportion of these people roam eastward and westward along the coast, trading and hunting. In late years their movements have been guided chiefly by those of the whalers pursuing their quarry in the narrow belt of open water between the solid ice and the coast.

The Kopagmute (*Big River people.*)—In this subdivision I include all the Eskimo tribes living in the western interior of Arctic Alaska. Their habits are almost entirely unknown beyond the fact that they form the connecting link between the coast people in the north and the Athabaskans in the south.

The Nunatagmute (*inland people.*)—This subdivision includes both the Nunatagmute and Kowagmute of Dall, comprising the inland tribes living on the Noatak and the Kowak rivers. Of these people we also know but very little beyond the fact that they live on the upper rivers, have communication with the Athabaskans of the northern Yukon region, with whom they have mixed, on the head waters of the Koyukuk River. Mr. E. W. Nelson, who saw some of these half-breeds on Kotzebue Sound, describes them as resembling in stature and facial peculiarities the Athabaskan, while speaking an Eskimo dialect.

The Mahlemute.—The Mahlemute inhabit the country between Kotzebue and Norton sounds, occupying villages upon the coasts of both these estuaries. In their mode of life they resemble the Arctic Eskimo, but they are the traders par excellence of all this region; indulging, however, frequently in robbery and violence when trade is slack. They serve as middlemen in the exchange of commodities between Bering Sea and the Arctic, drawing their supplies of stock in trade chiefly from the depots of St. Michael, which place they visit during the summer in large open skin boats fitted with masts and sails. The Mahlemutes are expert navigators and bold hunters, but their reputation with whalers and traders is decidedly bad, and great caution is observed in intercourse with them. They are naturally anxious to maintain their profitable position as middlemen, and thus far have resented all attempts to locate permanent trading stations among them or within the limits of their own mercantile operations.

In dress and appearance the Mahlemute do not differ from their neighbors. In the sketch herein inserted they are represented as they appear in their summer encampments on Norton Sound. The southernmost village permanently occupied by the Mahlemute is Shaktolik, on Norton Bay, but several families possess winter houses in the vicinity of the trading post of Oonalakleet, within the boundaries of another tribe. Their festivals are distinguished for variety, there being one in honor of nearly every animal hunted by the people, most of them being celebrated during the period of winter idleness, the "reindeer dance" and the "whale dance" being among the most important ceremonies, which are accompanied by the most grotesque display of masks and costumes. The "labret" or cheek ornament, of bone, ivory, or stone, is still worn by the Mahlemute as universally as it is found among the coast tribes in the north and west; and even where the ornament itself is absent the cut made in the cheek and under lip for its insertion can be observed. All the masks are provided with an imitation of this ornament. The custom of trimming the hair of the head exists among the Mahlemute as well as among nearly all the tribes of Eskimo stock, but the shaving of the entire crown of the head of males seems to be confined to the Arctic tribes. Wherever the Eskimo appear together with their interior neighbors it is easy to distinguish the long, unkempt, matted hair of the Athabaskan from the closely-cropped bullet heads of the Eskimo.

The Kingigumute (*including the Okeeagmut of Dall and the Okeeagmut of Kings Island*).—This unruly and warlike tribe occupies the country adjoining Cape Prince of Wales and the

islands of Bering Strait. They are also great traders, and act as middlemen between the people of Asia and those of America. They hunt but little, living chiefly on the profits of traffic. Their reputation with whalers and traders is fully as bad as that of the Mahlemute on Kotzebue Sound. Their festivals and superstitions closely resemble those of their neighbors; and the same can be said substantially of their southern neighbors.

The Kaviagmute.—This tribe occupies the portion of the Kaviak Peninsula south of Port Clarence and east of Norton Bay and the Mahlemute territory.

The Oonaligmute (the Unaligmute of Dall).—This tribe occupies the coast of Norton Sound from Shaktolik down to the mouth of the Yukon, extending back into the interior as far as the range of hills forming the boundary between the Eskimo and the Athabaskan tribes.

The Ikogmute.—This tribe occupies both banks of the Yukon River from its junction with the Chageluk River near the village of Paimute to its mouth, occupying the east coast between Kotlik and the Kusilvak Branch of the Yukon.

The Magmute (or Mink people).—This tribe adjoins the Ikogmute in the south, extending to the line between the Kvichak River and Cape Rumiantzof.

The Nunivagmute.—This tribe occupies Nunivak Island, and also a few settlements on the Kashunok Branch of the Yukon.

The Kaialigumute.—This tribe occupies the coast from Cape Rumiantzof to Cape Avinof, with the exception of the Kashunuk settlement, but including the villages on Nelson Island.

The three tribes last enumerated were classed together by Dall as Magmute, but sufficient differentiation has been discovered by Mr. Nelson to warrant the new divisions.

To all the coast tribes between Kotzebue Sound and the mouth of the Kuskokwim River may be applied the description furnished by Lieutenant Zagoskin in the year 1843. He stated in substance that the natives of Norton Sound and their neighbors are of medium stature, well built, quick in their movements, with round faces, varying in complexion from an almost white to a light bronze. All the males exhibit some trace of beard, and mustaches are quite common. The hair is black, coarse, and straight, but glossy; the mouth large, not curved; teeth even and white. The men wear labrets in the lower lip on each side of the mouth, consisting of stone or bone buttons; but among the females this latter custom has long been obsolete. The men trim their hair all round the head, while the women confine this operation to the vicinity of the ears, wearing the back hair either loose or plaited.

No chiefs are known to exist among them, though some families have acquired prominence and influence, chiefly through the accumulation of what they consider wealth. The oomailik, the most experienced tradesman of the village, who serves as spokesman in all transactions with strangers, exerts his influence only as agent or business manager. If a joint action of a number of the inhabitants of a village becomes necessary for any purpose, the old men assemble in the councilhouse, or kashga, where they settle upon the plan of action for the distribution of labor; and no young man will venture to disregard the decision of his elders in council.

These coast tribes, being essentially a trading people, are possessed of greater shrewdness than their neighbors in the interior, but they rarely use this superiority for the purpose of cheating in trade, as all their capacity in this direction is reserved for their intercourse with white people. As a rule these tribes do not practice polygamy, though a few instances have been known of wealthy traders who maintained separate households in the various settlements visited in pursuit of their business. No especial marriage ceremony seems to be observed, though the consent of parents seems to be essential to the accomplishment of a union. The bridegroom either takes away his bride to his own people or she remains with her family. Separations rarely occur, but in such cases the children remain with the mother. A man who has lost two or three wives rarely succeeds in obtaining a fourth.

The females of the coast tribes are not fruitful, and to see four children of one mother is quite a rare occurrence, one or two being the common number of children to a family. Marrying early, as a natural consequence the women fade early; a wife of twenty-five is always an old woman. The children are treated with great tenderness, but grow up in perfect liberty until they are self-supporting, and their every want or whim is satisfied by the parents, even at the

greatest inconvenience to themselves. The young of both sexes acquire skill in their respective labors early while playing with the diminutive arms, tools, and implements fashioned for this purpose by their parents. Festivities take place at certain periods during the lives of children; for instance, when the boy's hair is trimmed for the first time, or when he first goes to sea alone in a kaiak, or when he dons his first pair of snowshoes, or when the first incision in his lip is made to accommodate the labrets, a feast is given by the parents if they are able to do so; but in cases of great poverty these ceremonies are frequently postponed until the young man himself is able to provide the necessary material. No youth is considered to have reached manhood until he has killed either a wolf, a reindeer, or a beluga.

The shamans or sorcerers living among these people furnish children with amulets or charms, consisting of little ivory carvings, or pieces of skin fancifully braided, or other articles to be worn around the neck, and the parents frequently go to considerable expense to secure such talismans.

The men sometimes change their names several times during their lives by assuming a new one after every great memorial feast given in memory of a deceased relative.

A woman after childbirth is not allowed to partake of fresh food for twenty days, during which time she must stay within the house, generally sitting in some dark corner with the infant; and every five days during this period she must bathe.

Like all Eskimos these tribes are superstitious and afraid of the dead or dying, though they seem to reverence the memory of the deceased; and sometimes a sick person at the point of death is carried into an abandoned hut and left there alone to die of hunger and neglect. The dead bodies are generally wrapped up in mats, with the knees drawn up to the chin, and are covered up with rocks or pieces of drift-log; and the skulls of reindeer or bear are frequently placed beside such burying places, especially if the deceased had been a hunter. After the death of a husband the wife cuts her front hair short, and abstains for a period of twenty days from fresh food; the husband frequently observing the same custom on the death of his wife. The festivals in memory of the deceased are celebrated at various times of the year, chiefly at times of leisure between the seasons for hunting various animals. In addition to the annual memorial feasts, grand festivals are celebrated at intervals of ten and fifteen years, according to the ability of the surviving relatives to accumulate sufficient property for the purpose, and on such occasions the giver of the feast frequently distributes all his property among the guests.

The clothing of these coast tribes consists of furs, especially the skin of reindeer. Garments made of marten, muskrat, or ground-squirrel skins they receive from the Yukon River, while mink skins are used chiefly for making gloves and the trousers of women. The upper garments, or parkees, have short sleeves and do not reach below the knee, those of the males being the same length all around, while those of the women are slit on the sides. The men wear one pair of pantaloons with the fur inside; the women wear two, one short, reaching not quite down to the knee, generally made of tanned buckskin or reindeer-fawn skin with the fur inside, the other long with the fur outside. They have no buttons or hooks, and the pantaloons are attached to a belt with straps. The boots for winter use are generally made of the skins of reindeer legs, and reach about half way up the calf of the leg; some of these are richly trimmed with wolverine or white reindeer skin. The summer boots are made of seal skin, reaching up to the knee and above; the soles being made of the thickest portion of the hair-seal skin. The winter parkees are usually provided with a hood which can be drawn over the head. The most valuable of these garments are obtained from the Mahlemutes, who purchase them of the Chukches in Siberia. These garments are made of the skins of tame reindeer. A woman clothed in one of these parkees and provided with boots made of the skins of white tame reindeer considers herself dressed in the height of fashion, and attracts much attention from the youths of her tribe. For convenience in walking the parkees are girded up with a belt, the latter being worn far below the waist.

The skin of the wolf is much valued for trimming garments, and to obtain these the coast tribes formerly resorted to an artifice which has been superseded at present by the use of steel traps. In the middle of winter, when the snow was deep and the wolf hungry, the hunter would whittle down strips of whalebone about two feet in length, roll them up, wrap them in pieces of

seal blubber, and throw them promiscuously about the vicinity. A hungry wolf would bolt down one of these frozen lumps, when, the heat of the stomach melting the fat, the piece of whalebone would be released and straighten out, killing the animal, and in the morning the hunter would go out and pick up his quarry.

Reindeer are generally captured by these tribes by surrounding the herd and shooting the animals with arrows or bullets as they approach the concealed hunters. Fish are caught both with nets and hooks and lines; and seals are generally shot or speared on the ice in the winter, or as they come up to their breathing holes. While watching for seals the hunter piles up pieces of ice before him and wears a white reindeer skin parkee in order to conceal himself from the vigilant animal. The beluga is hunted by numerous parties in kaiaks. Sometimes a hundred or more of the natives proceed to sea on a calm summer day, observing perfect silence, and keeping well inshore. As soon as a school of belugas is sighted an old man gives a signal, the kaiaks hurry to seaward of the school, and a tremendous noise begins, with shrill cries and yells, beating of drums and rattles, and splashing of paddles and spears in the water. The hunters gradually approach the shore, driving the belugas before them, until the latter, in the shallow water, fall an easy prey to their spears. In former times, when the beluga was more plentiful, from one to two hundred were secured in this way in a single day; and the old men and the women and children crowded the shore ready to drag off the carcasses beyond the reach of the tide.

All of these tribes shun the use of iron in killing the beluga, confining themselves entirely to spear and arrow heads of stone and bone. Inflated bladders of whole skins of the young seal are attached to the spear heads, serving to buoy up the wounded animal and keep it from diving. The blubber, meat, and skin of the beluga are all valued alike as food when fresh, and the tanned hide is used for making boots, covering kaiaks, and making nets. The tanning is generally accomplished with rotten fish roe.

All these tribes have summer dwellings distinct from those used during the winter. For the winter houses a square excavation of about 3 feet or more is made, in the corners of which posts of driftwood or whale ribs from 8 to 10 feet in height are set up; the walls are formed by laying posts of driftwood one above the other against the corner posts; outside of this another wall is built, sometimes of stone, sometimes of logs, the intervals being filled with earth or rubble; the whole of the structure, including the roof, is covered with sods, leaving a small opening on top, which can be closed by a frame over which a thin, transparent seal skin is tightly drawn. The entrance to one of these houses consists of a narrow, low, underground passage from 10 to 12 feet in length, through which an entrance can only be accomplished on hands and knees. The interior arrangement of the winter house is very simple, and is nearly the same with all these tribes. A piece of bear or reindeer skin is hung before the interior opening of the passage; in the center of the inclosure is the fireplace, which is a square excavation directly under the smoke hole in the roof; the floor is generally planked, and frequently two low platforms about 4 feet in width extend along the sides of the house from the entrance to the back, and covered with mats and skins which serve as beds at night. In the larger dwellings, occupied by more than one family, the sleeping places of each are separated from each other by suspended mats, or simply by a piece of wood. All the bladders containing oil, the wooden vessels, kettles, and other domestic utensils, are kept in the front part of the dwelling, and before each sleeping place there is generally a block of wood upon which is placed the oil lamp used for heating and cooking.

The summer houses are erected above ground and are generally log structures roofed with skins and open in front; no fire is made in these houses, and therefore they have no opening in the roof, all cooking being done in the open air during the summer. They seldom have flooring, but otherwise the interior arrangements resemble those of the winter houses. The storehouses of all the Eskimo tribes are set on posts at a height of from 8 to 10 feet above the ground, to protect them against foxes, wolves, and dogs. They have generally a small square opening in front that can be closed with a sliding board, and which is reached by means of a notched stick of wood. These buildings are seldom more than 8 feet square by 3 or 4 feet in height.

In every village there is a common building known as the kashga, built after the pattern of the winter houses, but of much larger dimensions, some kashgas measuring as much as 60 feet

square and from 20 to 30 feet in height. A raised platform runs all around the interior, and, in a few kashgas of extraordinary size, three tiers of such platforms have been observed. The fireplace in the center is large, often 3 or 4 feet deep, and on ordinary occasions, when no fire is wanted, is covered over with planks. The entrance is through a passage resembling that of the dwelling houses, but divided at the end; one branch leading to the fireplace below the flooring, the other into the main compartment. In this building the men carry on their domestic labor, such as the preparing of skins, the plaiting of fish traps, and the manufacture of sleds. In the kashga all public business is transacted and councils held; and it also serves as shelter for all guests and visitors, who are there entertained, as well as the theater for all festivals, mask dances, and representations. In addition to this the kashga serves as a sleeping place for adult males; and finally, also as a bath—the most popular recreation of the Eskimo tribe.

The cooking of these natives is a very simple matter, though they do not eat raw fish or meat unless it is frozen or dried in the air. All the offal of meat and fish is given to dogs. The meat when boiled is never well done, being merely kept in boiling water for a short time. The oil of the beluga or of the seal is considered as the most palatable sauce for everything—meat, fish, or berries; while rotten fish and fish roe, considered luxuries, are preserved in wooden vessels for festive occasions, and the heads of salmon are buried in the ground to give them the desired high flavor. With such a diet no cleanliness in cooking or eating can be expected. As a rule, these natives are moderate eaters. In the morning the wife or some other female relative brings to the husband, father, or brother who has slept in the kashga, a *kantag*, or wooden bowl, with cold water, together with a piece of dried, frozen, or boiled fish weighing perhaps a pound. After breakfast the men follow their various pursuits of hunting and fishing, and sometime in the afternoon, having indulged in a bath, they partake of another piece of fish or meat of about the same weight, with the addition of a tidbit of rotten fish or spawn, which they eat sitting on their haunches, while the women turn their backs to them, as it would be unbecoming to watch them eating. Visitors are thus served by the wives or daughters of those whom they visit. An evening meal is frequently, but not always, partaken of at home in the dwellings; but the women and children always eat at home.

Their means of transportation consist in the kaiak, the oomiak (bidar), and in winter the dog sled, as they are all alike skilled in propelling the kaiaks and in the management of dog teams.

The sleds used by the coast tribes are generally from 8 to 12 feet long, and the dogs are harnessed tandem. Their snowshoes consist of a very light frame of spruce wood over which is stretched a network of seal hide, which supports the foot—the toes only being attached to the shoe by means of a small strap. The length of the Eskimo snowshoe is about 3 feet.

In addition to the spears propelled by hand used in hunting the beluga and the maklak seal the coast tribes also have spears especially adapted for killing birds and reindeer; these they shoot by means of bows, and the bird spears are divided into several prongs, with the object of dragging down the bird if it be not killed. The spearheads for killing reindeer are made of walrus ivory, and are provided with teeth on one side; these weapons are still preferred to bone points. The shafts of both arrows and spears are made of spruce or larch wood, obtained on the Yukon at the head of Norton Bay; the length of the shaft is from 2 to to 3 feet, and that of the bone head from 5 to 6 inches, while the point proper measures about 2 inches. The bows also are manufactured of spruce and larch wood, and the strings are made of the sinews of the seal or whale.

Independent of the great annual and periodical festivals accompanied by religious or superstitious rites, and to attend which the people from different villages flock together, the coast tribes also indulge in private festivals or evening entertainments during the late autumn and the beginning of winter. As among other mortals, singing, dancing, and eating form the principal objects of such merrymakings. On these occasions, however, one family does not invite another to pass the evening, as either the whole population of the village attend promiscuously, or the women invite the men, treating them to delicacies of their own providing, or vice versa. To pass the time, masquerading is often resorted to, in which case the women who give

the entertainments appear in male garments, with mustaches, and with bead pendants in the under lip, and dance like the men; the latter, on the other hand, representing women.

The subjects of their songs are of indefinite variety, but the melody as well as the time of their only musical instrument, the bladder drum, is always the same: first one stroke, then a pause; then two strokes, the second stronger than the first, then another pause; again two strokes, a pause; and so on, producing a rather monotonous noise.

All these games, both private and public, take place in the kashga. At the public performances the dancers and singers, men and women, stand around the fire hole; and the men, to the time of the drum and the singing, go through various contortions of the body, shifting from one foot to the other without moving from the spot, the skill of the dancer being displayed only in the endurance and flexibility of his muscles. The women, on the other hand, with their eyes cast down, motionless, with the exception of a spasmodic twitching of the hands, stand around in a circle, forming, we may say, a living frame to the animated picture within. The less motion a dancer displays the greater his skill. There is nothing indecent in the dances of the seaboard natives. The dancing dress of the men consists of short, tight drawers made of white reindeer skin, and the summer boots of the Chukche, while the women on such occasions only add ornaments, such as rings and bracelets and bead pendants, to their common dress, frequently weighting themselves down with 10 or 15 pounds of these baubles.

The entertainment of the women was described by Zagoskin as follows:

> We entered the kashga by the common passage and found the guests already assembled, but of the hostesses nothing was to be seen. On three sides of the apartment stone lamps were lighted, the fire hole was covered with boards, one of them having a circular opening, through which the hostesses were to make their appearance. Two other burning lamps were placed in front of the fire hole. The guests, who formed the chorus, began to sing to the sound of the drum, two men keeping them in order by beating time with sticks adorned with wolfs' tails and gulls' wings. Thus a good half hour passed by. Of the song my interpreter told me that it consisted of pleasantry directed against the women; that it was evident they had nothing to give, as they had not shown themselves for so long a time. Another song praised the housewifely accomplishments of some woman whose appearance was impatiently expected with a promised trencher of the mixed mess of reindeer fat and berries. No sooner was this song finished than the woman appeared and was received with the greatest enthusiasm. The dish was set before the men, and the woman retreated amid vociferous compliments on her culinary skill. She was followed by another woman. The beating of drums increased in violence and the wording of the song was changed. Standing up in the center of the circle the woman began to relate, in mimicry and gesture, how she obtained the fat, how she stored it in various receptacles, how she cleansed and melted it, and then, placing a kantag upon her head, she invited the spectators with gestures to approach. The song went on, while eagerness to partake of the promised luxury lighted up the faces of the crowd. At last the wooden spoons were distributed, one to each man, and nothing was heard for a time but the guzzling of the luscious fluid. Another woman appeared, followed still by another, and luxuries of all kinds were produced in quick succession and as quickly dispatched, while the singers pointedly alluded to the praiseworthy Russian custom of distributing tobacco. When the desired luxury had been produced, a woman represented with great skill the various stages of stupefaction resulting from smoking and snuffing. All the women appeared in men's parkees.

The men's entertainment witnessed by Zagoskin took place in the same village. The preparatory arrangements were the same, one of the women, a sorceress, leading the chorus. The first song on that occasion praised the propensity of the Russian for making presents of tobacco, rings, and other trifles to the women, who, in their turn, were always ready to oblige them. This, however, was only introductory, the real entertainment beginning with a chorus of the men concealed in the fire hole. The gist of their chant was that trapping, hunting, and trade were bad, that nothing could be made, and that they could only sing and dance to please their wives. To this the women answered that they had long been aware of the laziness of their husbands, who could do nothing but bathe and smoke, and that they did not expect to see any food produced, such as the women had placed before them, consequently it would be better to go to bed at once. The men answered that they would go and hunt for something, and shortly one of them appeared through the opening. This mimic, who was attired in female apparel, with bead pendants in his nose, deep fringes of wolverine tails, bracelets, and rings, imitated in a most admirable and humorous manner the motions and gestures of the women in presenting their luxuries, and then gave imitations of the various female pursuits and labor, the guests chuckling with satisfaction. Suddenly the parkee was thrown off, and the man began to

represent how he hunted the maklak, seated in his kaiak, which performance ended with the production of a whole boiled maklak, of which Zagoskin received the throat as his portion. Others represented a reindeer hunt, the spearing of birds, the rendering of beluga blubber, the preparation of seal intestines for waterproof garments, the splitting of deer tendons into thread, and so forth. One young orphan possessing nothing wherewith to treat the guests, brought on a kantag filled with water, which was drunk by the women amid much merriment. It sometimes happens on these occasions that lovers of fun sprinkle the women with oil, or with the fluid which they use in place of soap, squirted from small bladders concealed about their persons; and such jokes are never resented.

The Eskimo tribes all look upon the shamans or conjurers (*tungaks*) as mediators between themselves and the invisible world, but it is impossible to say whether or not they believe in the actual control of spirits by the conjurers. A majority of these individuals have considerable practice in tricks of sleight of hand; at the same time they do not seem to enjoy much respect, unless they combine with the business of conjuring the qualities of an expert trader and skilled hunter. The tungak, in addition to calling spirits proper (*ikhchingak*), also claimed the power to force the souls of deceased members of their family to enter his (the tungak's) body. The spirit or principle of life (*iltkhluaghúm*) is invoked on all occasions, but principally in cases of sickness. It is believed that he appears in five distinct forms. A creator of the world, called *Nunalukhta*, also occasionally appears in traditions of the coast people.

A festival in honor of the spirits of land and sea, and in memory of deceased kinsmen, is celebrated annually in the month of October or November, in the following manner: At sunset the men assemble in the kashga, and, after a hurried bath, ornament each other by tracing various figures with a mixture of oil and charcoal on the naked back. Two boys, who for this occasion are respectively named the Raven and the Hawk, are in attendance, mixing the paint, etc. Finally the faces also are thickly smeared, and then the females are summoned into the kashga. After a brief lapse of time a noise is heard, shrieks and yells, snorting and roaring, and the disguised men, emerging from the fire hole, show their heads above the floor, blowing and puffing like seals. It is impossible to distinguish any complete human figure, as some are crawling with their feet foremost, others running on their hands and feet, while the head of another is seen protruding between the legs of a companion. They all cling together and move in concert, like one immense snake. A number of men wear masks representing the heads of animals, and the unsightly beings advance upon the spectators, but chiefly endeavoring to frighten the women, who have no means of escaping molestation except by buying off the actors with presents. Knowing what was before them, they have brought the kantags or wooden bowls full of delicious morsels—beluga blubber, walrus meat, whale-oiled berries, and other dainties. When each of the maskers has eaten and filled a bowl or two with delicacies to take home, they indulge in a pantomime and gesture play of a highly grotesque character. After completing the ceremony in the kashga the maskers frequently visit some of the dwellings and receive gifts in each, the whole performance ending with singing, dancing, and feasting in the kashga.

An annual memorial feast, celebrated in one of the villages on Norton Sound, was described by Zagoskin as follows:

On the day before the festival the people from neighboring villages had assembled to the number of seventy, exclusive of children. On the following day the givers of the feast proceeded to the burial ground, for the purpose of renewing the memorial posts and depositing the head of a reindeer with its entrails; wooden bowls with various articles of food were also deposited. In the evening the kashga was filled with people, but the most profound silence reigned. The feast was in memory of seven deceased persons, and accordingly seven huge stone oil lamps were placed around the fire hole. Before the beginning of the ceremonies the givers of the feast, dressed in their best apparel, deposited upon the floor the articles intended for distribution in memory of their dead kinsmen. These articles consisted of spears, arrows, garments of various kinds, seal skins, paddles, knives, hatchets, rings, tobacco, mats, and various trifles. Each giver proclaimed in a loud voice for whom each article was intended, and then delivered it in silence. At the end of the distribution the spectators and hosts divided themselves into four groups, one in each angle of the kashga. One of the visiting old men, assisted by a number of women, began to chant a song especially composed for the occasion by the shamans or tungaks, acting as masters of ceremonies. The voices of the singers were kept in a low key; drums and rattles were not used on this occasion. Then the givers of

the feast represented in pantomime, without stirring from their places or moving a foot, the deeds of their deceased relatives. After the pantomime, which lasted half an hour, the performers left the kashga. After the lapse of about fifteen minutes the whole floor of the kashga was covered with food; there were mountains of blubber, several whole boiled seals, huge piles of dried fish, and also, to my astonishment, several wooden dishes with clean water. Several of the givers of the feast produced as many as fifteen different dishes. All those who rejoiced in the same name as the dead in whose honor the feast was given were selected and presented with one of the small bowls of water, which they seized, wetted their fingers and sprinkled a few drops of water upon the floor, whispering, at the same time, "Drink, our dead kinsman." Then these namesakes of the dead were presented with bowls of food, and they also scattered a few morsels upon the floor, saying, "Take this, our dead kinsman, from our stores, and help us to obtain more during the coming year." After this the gorging became general.

The smallpox had decimated these tribes but a few years previously, and the number of bowls of water distributed in memory of its victims was very great.

It has already been mentioned that many individuals gave away all their property on such occasions. If it happens that during such memorial feast a visitor arrives from a distant village who bears the same name with the subject of the celebration he is at once overwhelmed with gifts, clothed anew from head to foot with the most expensive garments, and returns to his home a wealthy man.

Another festival, in honor of the spirits of the sea (*ingiak*), is celebrated by the coast tribes during a whole month. The preparations for this gathering begin early in the autumn. Every hunter preserves during the entire year the bladders from all such animals as he kills with arrows. The mothers also preserve with the greatest care the bladders of all rats, mice, ground squirrels, or other small animals killed by their children. At the beginning of December all these bladders are inflated, painted in various colors, and suspended in the kashga, and among them the men hang up a number of fantastically carved figures of birds and fish. Some of the figures of birds are quite ingeniously contrived, with movable eyes, heads, and legs, and are able to flap their wings. Before the fireplace there is a huge block wrapped up in dry grass. From morning until night the carved figures are kept in motion by means of strings, and during the whole time a chanting of songs continues, while dry grass and weeds are burned to smoke the suspended bladders. This fumigating process ends the day's performances, which are begun anew in the morning. In the evening of the culminating day of the festival the strings of bladders are taken down and carried by the men upon painted sticks prepared for the occasion, the women, with torches in their hands, accompanying them to the seashore. Arrived here, the bladders are tied to the sticks and weighted with stones, and finally thrown into the water, where they are watched with the greatest interest to see how long they float upon the surface. From the time of sinking and the number of rings upon the water where the bladder has disappeared the tungaks prophesy success or misfortune in hunting during the coming year.

A final memorial feast in honor of a distinguished ancestor is conducted as follows:

Eight old men clad in parkees enter the kashga, or council house, each carrying a stone lamp, which they deposit around the fire hole. They next produce three small mats and spread them upon the floor in three corners of the building, and from the spectators three men are selected who are willing to go to the grave. The three nearest relatives of the deceased then seat themselves on the mats and divest themselves of all their clothing, wash their bodies, and don new clothes, girding themselves with belts manufactured several generations back and preserved as heirlooms in the family. To each of these men a staff is given, and they advance together to the center of the kashga, when the oldest among the invited guests sends them forth to call the dead. The messengers leave the building, followed by the givers of the feast. After an absence of ten minutes the former return, and through the underground passage the whole population of the village crowds in, from the old and feeble down to children at the breast, and with them come the masters of ceremonies, wearing long sealskin gloves, and strings of sea-parrot bills hanging about the breast and arms, with elaborate belts nearly a foot in width, consisting of the white bellies of unborn fawns trimmed with wolverine tails. All such ornaments are carefully preserved and handed down from generation to generation, some of them being made of white sable—an exceedingly rare skin—for which high prices are paid, as much as 20 or 30 beavers or otters for 1 small skin. The women hold in their hands one or two eagle feathers, and tie around the head a narrow strip of white sable. Each family, grouping itself behind its own stone lamp, chants

in turn in mournful measure a song composed for the occasion. These songs are almost indefinitely prolonged by inserting the names of all the relatives of the deceased, living and dead. The singers stand motionless in their places, and many of those present are weeping. When the "song of the dead" is concluded, the people seat themselves, and the usual feasting and gorging ensue. The next morning, after the bath indulged in by all the males, the multitude again assembles in the kashga. The chanting around the fire hole is renewed in the same mournful tone, until one old man seizes a bladder drum and takes the lead, accompanied by a few singers, and followed in procession by all participants in the feast. They walk slowly to all the sepulchers in succession, halting before each to chant a mourning song; the visitors not belonging to the family in the meantime crowding upon the sodded roofs of the houses, watching the proceedings. In the evening all that remains of food in the village is set before the people, and when the last kantag is scraped of the last remnant of its contents the feast is ended, and the visitors at once depart for their homes.

Occasionally the giver of such a feast, desiring to do special honor to the object of it, passes three days sitting naked upon a mat in a corner of the kashga, without food or drink, chanting a song in praise of his dead relative. At the end of such a fast the visitors present gifts to him; the story of his achievement is carried abroad, and he is made famous for life among his fellows.

The history of a day as it passes in an Eskimo village on the Bering Sea coast will furnish the best description of the manners and customs of these people. As has already been mentioned, it is customary with the men to sleep in the kashga, a few having reindeer skins as bedding, and those who are without them sleep on the bare planks, covering themselves with their parkees and using their nether garments as pillows, feather pillows seeming to be the prerogative of the wealthy only. In the winter time the day begins at about 8 o'clock. Whoever happens to be first awake lights the oil lamp, if any of the fluid remains from the previous night; if not, he emerges from the kashga and brings a supply from his home. The kashga is common property, though a few old men, who probably assisted in building it, assume the duties of hosts on certain occasions. Axes, wedges, and other tools are brought to the kashga from time to time, and are also considered common property as soon as they have been deposited. The huge stone lamps for lighting do not require any repairs, and are handed down from generation to generation; but if any material is wanted, such as planks, dried grass, etc., for repairing the building, it is at once furnished by those who happen to have it on hand.

A few of the men prepare breakfast in the kashga, but to most of them the meal is brought in by their wives or some other female relatives. After breakfast it is deserted for a time, the men going out to look after their traps and fish nets, or to hunt in the neighborhood. The women assist their husbands in harnessing the dogs and then, in their turn, go out to gather dry wood, or to employ themselves in domestic labor, sewing or patching, making threads from deer tendons, or plaiting mats or socks. Nearly all the coast tribes here discussed wear, always in the summer and frequently during the winter, socks made very skillfully of dried grass by the women. Occasionally a woman may be seen hammering with all her might one of the posts of a storehouse without any apparent purpose; she is in the last days of pregnancy, and that kind of exercise is considered conducive to an easy delivery. The boys and girls scatter about the vicinity to look after their snares and traps set for hares and grouse. About an hour after noon the thickening, whitish smoke arising from the dwellings indicates the dinner of the children; after that the adults assemble for the same purpose. The wife divests her husband of his wet garments, unharnesses the dogs, deposits the sled on the roof of the dwelling, and stores away in the storehouse the fish or game brought home by the husband, always laying aside a portion for days when the inclement weather will keep the provider at home. During the winter from four to five days frequently pass when the hunters have no opportunity to leave the house to look after their nets and traps. The dinner over, the kashga begins to fill up. Men bring their work and pass away an hour repairing arms, tools, nets, and other implements, until somebody suggests a bath; this meets with general approbation, and preparation begins. Wood is carried in by the armful, the fire lighted, and the men bring from their houses their toilet articles—a wisp of dry grass, a basin, and a few branches of alder for whipping themselves into perspiration.

At last the bath is ready, the kashga is heated to suffocation and full of smoke, the men throw off their garments, and with shouting, dancing, and whipping bring themselves into perspiration; then a liberal application of their disgusting substitute for soap produces a lather, which is rinsed off with cold water and finally removed by the bathers rushing out of the building and rolling in snow, or jumping into the river should it be free from ice. The first part of the process creates a terrible stench in the kashga, which is still increased and perpetuated by throwing the remains of the fluid contained in a bowl into the four corners of the building.

While the men are indulging in the bath we will watch the sports of the young people outside. Some boys and youths have organized a jumping match; a number of willow branches are placed upon the ground at a distance of 6 or 7 feet from each other, and the contestants endeavor to jump from branch to branch without removing them from their places. Gradually the distance between the marks is increased until but a few active individuals succeed in accomplishing the feat. In the meantime the women are chasing each other over the snow, screeching and laughing, and if one happens to fall she is jeered most heartily and nearly smothered with snow thrown upon her by the spectators. The bath being over, the opening in the roof of the kashga is uncovered, and the men sit around the platforms, stupefied with heat and smoke and weak from profuse perspiration. Some of the more ambitious youths propose another contest, while the fresh air gradually enters the kashga and makes it habitable once more. An arduous task is set—to go to the river and in the shortest possible time to pierce the ice, at least 4 feet in thickness. One of the old men is chosen as umpire and the whole party proceeds to the river bank. The tools employed are crude ice-picks and bone crowbars, and it is astonishing with what rapidity this solid ice is pierced, while a shower of sparkling fragments flies up and over the ambitious workmen. In five or six minutes the feat is accomplished, water welling up through the opening made by the victor, who is escorted back to the kashga amid general acclamation.

Evening is approaching, the people are scattering about the village, when away in the distance on the ice of the river two sleds appear in sight, and children playing on the river bank are first to discover them; but no particular attention is paid to the incident. The travelers approach and put up at one of the dwellings; it is a family consisting of a man, a woman, a grown-up daughter, and a small boy. Nobody meets them, but the new arrivals, seeming perfectly at home, tie their dogs to the posts of the storehouse, discharge their lot of provisions or utensils, and place the sleds on top of the roof. The women and the boy then enter the house while the man proceeds to the kashga, which he enters without any solicitation—in fact, words of salute are missing in the vocabulary of this people. Making his way to one of the platforms he shakes the snow from his boots, then takes them off and hangs up his outer garments to dry; he then divests himself of his gloves or mittens and draws his arms out of the sleeves of the inner parkee. Seating himself he may remark to the man next to him, "I sit beside thee," to which the other will answer "Tavai, tavai;" an expression of assent, with no very definite meaning. The newcomer then lights his pipe or takes a pinch of snuff, and after thus refreshing himself begins to talk. He does not address himself to anybody in particular, but communicates what has happened along the line of his journey, what he has seen and what he has heard in the various villages through which he has passed; but everything is related in a disguised, indefinite manner. For instance, he says: "Russians or traders have been in such a village and made presents of tobacco." This means that he has seen the strangers and himself received presents, without specifying where the meeting took place and what other villages were visited by the Russians. Or he will say that such a man lies in the kashga dressed in a new parkee, with his head against a wall; which means that somebody has died. Again he says in such a house the shaman or tungak is busy, a sign of sickness; of another family he says that oil and blubber are plenty with them, without going to the trouble to explain that the head of the house has returned from a long hunting or trading journey crowned with success; but who died, or who was sick, or who was fortunate in hunting, is only ascertained upon further questioning, which may be postponed for days. At the time of the first narrative just described nobody makes any remarks except, perhaps, "*Ah kika*," an affirmative exclamation.

The stranger has not come to see anybody in particular, but wishes to dispose of some goods

in exchange for other articles he needs. After having told his tale, in the fragmentary manner described above, he brings into the kashga all he wishes to barter, declaring at the same time that for such an article he wishes to exchange such other commodity. Every one present inspects the articles deposited on the floor, and if one finds anything of use to him he leaves the kashga without saying a word and brings the article asked in exchange, which is at once submitted to the inspection of all present. If the stranger is not satisfied he remains silent, the purchaser withdraws, and others try their fortune until a trade is made. Here comes a man who purchased something of the stranger a year or two previously, but, ruing his bargain, returns the article, saying simply, "This does not suit me." The other picks it up and returns without any remonstrance anything he has in his possession of equal value with the original price.

When night comes the kashga appears dark and empty, and the greater part of the men have gone to partake of supper in their own dwellings; but gradually they assemble again. Those who are well to do bring their quota of oil for the lamps, others bring their handiwork, while others again sit on their haunches, rocking backward and forward, listening to the narrative of the new arrival or to domestic gossip, from time to time refreshing themselves with smoke or snuff. Suddenly the sound of the drum is heard from one of the dwellings, accompanied by the chanting of the tungak, signifying that some sick man is being doctored. In one of the dwellings sits the patient suffering from fever and rheumatic pains; before him are placed two lighted oil lamps, and a parkee is drawn over his head, while two shamans or tungaks, one standing on each side, alternately sing and beat the drum. Behind them, faintly visible in the semi-darkness, is the head of an old woman, who, while imitating the croaking of a raven, rubs and pounds the back of the patient. If the pain does not cease the old woman changes her tactics and also her voice, imitating successively the chattering of magpies, the barking of dogs, and the howling of wolves; and if all this be in vain she throws herself upon the sufferer, cuffing and beating him until she makes him forget one pain in another, while the tungaks sing louder and louder and the drums give forth a deafening noise. At last she snatches the parkee from the patient's head, yells repeatedly, and points to the roof; the cover of the smoke-hole is removed and the evil spirit which has caused the sickness escapes amid the beating of drums and the triumphant cry, "He is gone! He is gone! Ugh! Ugh!" and the old woman, her task accomplished, collapses into a mass of rags upon the floor. It is the third spirit driven out of this patient—how many more dwell with him nobody can tell; if it was the last he will soon mend, but on the other hand, if not the last, there will be more chanting, more drumming, more cuffing, and more payments to the cunning tungaks, until the sick man either dies or can pay no more. The tungaks claim that their science and skill consist in discovering what spirit infests the sick man, and to drive it out they do not consider difficult at all.

At midnight the young men stretch themselves upon the platform of the kashga, which has been deserted by the married men, who have returned to their homes.

The Kuskokvagmute.—This tribe (the Kuskokvogmute of Dall, or the Kuskuchevak of Richardson), numbering between 3,000 and 4,000, occupies both banks of the Kuskokwim River from its mouth to the vicinity of Kalmakovsky, and are among the most interesting of the Eskimo tribes bordering upon Bering Sea. They were brought into contact with the Russians at an early date (1835), when Kolmakof explored the overland route from Bristol Bay to Norton Sound, along which route, now no longer traveled, the effects of Russian influence are quite perceptible; but the inhabitants of the lowlands about the river mouth have scarcely come in contact with Caucasians up to the present day. The labors of the Russian missionaries of the Yukon never extended to this region, though their registers and reports show quite a number of Christians on the Kuskokwim River. The only trace of Christianity among this tribe, outside of the immediate vicinity of the trading station with its chapel, consists of a few scattered crosses in the burial places adjoining the settlement. At the village of Kaltkhagamute, within three days' travel of the Russian mission on the Yukon, the graveyard contains a remarkable collection of grotesquely carved monuments and memorial posts, indicating very clearly the predominance of old pagan traditions over such faint ideas of Christianity as may have been introduced among

the people. Among the monuments in this place the most remarkable is a female figure with four arms and hands, resembling closely a Hindoo goddess, even to the almond eyes and the general cast of features. Natural hair is attached to the head, falling over the shoulders. The legs of this figure are crossed in true oriental style, and two of the hands, the lower pair, hold rusty tin plates, upon which offerings of tobacco and scraps of cotton prints have been deposited. The whole is protected by a small roof set upon posts. Other monuments are scarcely less remarkable in variety of feature and coloring, and the whole collection would afford a rich harvest of specimens to any museum. During my brief stay at this spot it was found impossible to ascertain anything of the meaning of these monuments or to gather any of the traditions of the people with reference to them, though several of the structures were quite new, one of them, in memory of a young man who had been killed accidentally while hunting, having been erected but a month previously. The presence of my Christian paddlers from the Yukon mission acted as a very efficient restraint upon the people of Kaltkhagamute, who nominally belong to the missionary fold. Nearly all these figures were human, though grotesque and misshapen, and drawn out of proportion. No images of animals or birds, which would have indicated the existence of totems and clans in the tribe, were to be seen; but here and there over apparently neglected graves a stick, surmounted by a very rude carving of a fish of the salmon species, could be discovered.

The burial places of the populous villages of the Lower Kuskokwim River abound in these carved monuments, but nowhere could I discover the totem among the emblems, though Mr. E. W. Nelson, of the United States Signal Service, claims that among the Kaialigamute of the great lake region of the delta he saw totem posts set up among the dwellings. As the people of the great lakes have always led an isolated existence, having been totally unknown to white men until Mr. Nelson went among them (the whole region having been covered by former map makers with a mountain chain), it is probable that they have preserved customs which their neighbors have long since discarded; and it is very desirable that some scientific explorer should locate himself for a year or two on the Lower Kuskokwim, in order to investigate thoroughly the ethnological features of this highly interesting region.

The Kuskokvagmute resemble in outward appearance their Eskimo neighbors in the north and west, but their complexion is perhaps a little darker. The men are distinguished from those of other tribes by having more hair on their faces; mustaches being quite common, even with youths of from 20 to 25, while in other tribes this hirsute appendage does not make its appearance until the age of 35 or 40. Their hands and feet are small, but both sexes are muscular and well developed, inclined rather to embonpoint. In their garments the Kuskokvagmute differ but little from their neighbors described above, with the exception of the male upper garment, or parkee, which reaches down to the feet, even dragging a little upon the ground, making it necessary to gird it up for the purpose of walking. The female parkees are a little shorter. Both garments are made of the skins of the ground squirrel, ornamented with pieces of red cloth and bits of tails of the squirrel, as depicted in the accompanying plate. The females wear no head covering except in the depth of winter, when they pull the hood of their reindeer parkee over the head. The men wear caps made of the skin of the ground squirrel, resembling in shape the famous Glengarry cap. The young men frequently wear a small band of fur around the head, into which they insert eagle and hawk feathers on festive occasions. The former custom of this tribe, of inserting thin strips of bone or the quills of porcupines through an aperture cut in the septum, seems to have become obsolete, though the slit can still be seen on all grown male individuals. The ears are also universally pierced for the insertion of pendants, but these seem at present to be worn by children only, who discard them as they grow up. In fact, all ornamentation in the shape of beads, shells, etc., seems to be lavished upon their little ones, who toddle about with pendants rattling from ears, nose, and lower lip, and attired in frocks stiff with embroidery of beads or porcupine quills, while the older girls and boys run almost naked, and the parents are imperfectly protected against cold and weather by a single fur garment.

The use of the true Eskimo kaiak is universal among the Kuskokvagmute, but in the timbered

regions on the upper river, in the vicinity of Kalmakovsky, the birch bark canoe also is quite common. The latter, however, is not used for extended voyages or for hunting, but is reserved chiefly for attending to fish traps, for the use of women in their berrying and fishing expeditions, and for crossing rivers and streams.

Each of the villages of the tribe has a kashga or council house, many of them of large dimensions, and in structure closely resembling those already described in the Yukon region and delta. The dwellings also are very similar to those already described; but as we descend the river and pass from forests into the desolate marshes or tundra, the dwellings, owing to scarcity of wood, become more wretched, until they finally appear little more than holes in the ground covered with low mounds of turf. The custom of performing all kinds of labor in the kashga prevails here as among the other tribes, and the same building is used for the celebration of festivals, which are of frequent occurrence among these sociable people; whole villages leaving their homes for two or three weeks to visit their neighbors and assist in dances and masked performances in memory of some deceased person of prominence. During such visits only the sick or the very aged are left behind. The steam baths, so common in all these regions, are also prepared in the kashga, but are indulged in only by the grown-up males.

The accompanying plate represents a beluga hunter of the Lower Kuskokwim and his humble home.

The Togiagamute.—This tribe has not heretofore been distinguished as a subdivision of the Eskimo, having never been visited by white men in their own country until the year 1880. They have remained thus isolated and unknown because their country affords no attraction to the trader in the shape of furs. They possess the general features of their Eskimo neighbors, but the males rarely have any beard until they are quite old. Their dwellings are of the most rude description, the villages resembling those of the prairie dog on a somewhat enlarged scale. This similarity is increased in the morning, when it is the custom of the men to crouch upon the apex of the low mound of sods, staring about aimlessly into vacancy, wrapped completely in their ground squirrel parkees. The Togiagamute—who may be divided into people of the coast and those of the interior or lakes—have held no communication with traders, except through the medium of a few individuals of the coast people who were bold enough to visit a small trading post some distance to the eastward of the mouth of Togiak River. The interior people, or Kassianmute, had never beheld the Caucasian until my visit. Of their domestic life but little could be ascertained, as women and children would fly screaming to hide in the tall grass of the tundra at first sight of the visitor, who was at once surrounded by a crowd of astonished and inquisitive males, nearly everything on and about the traveler and his canoe possessing the greatest interest for them, and loose articles, such as a compass and field glass, writing materials, etc., were passed around from hand to hand and closely inspected, but safely returned at last. An absence of the elaborate carvings found among the Kuskokvagmute is very noticeable here; the crudest images of fish and the human head and face being all they possess in this line. They lead a thoroughly nomadic life, wandering from place to place in search of game or fish, having no shelter beyond that afforded by a kaiak turned upon its side, supported by a paddle or two. This simple screen is shifted about as the wind changes, and whole families rest in the lee of this unsatisfactory shelter in pelting rainstorms, with only their heads enjoying the least protection. Among the Eskimo tribes heretofore described the traveler generally finds some one in each village who acts as spokesman, though not possessing any real authority, but the Togiagamutes seem to live in the most perfect state of independence of each other. Even the communities do not seem bound together in any way; families and groups of families constantly changing their abode, leaving one community and joining another, or perhaps forming one of their own. The youth, as soon as he is able to build a kaiak and to support himself, no longer observes any family ties, but goes where his fancy takes him, frequently roaming about with his kaiak for thousands of miles before another fancy calls him to take a wife, to excavate a miserable dwelling, and to settle down for a time.

A branch of this tribe occupies a few villages in a peninsula formed by Cape Newenham. These differ much in their habits and customs from their immediate neighbors, owing to the fact

that large droves of reindeer still roam over the mountains of the peninsula, the hunting of which seems to be a monopoly of these natives, whom we may distinguish as the Chingigumute or Cape people, and whose principal settlement is Azivigiak. The Chingigumute have been in contact with both Russians and neighboring tribes, as a portage route from the Kuskokwim to Togiak Bay leads through their country; consequently they do not differ much in their customs from the Kuskokvagmute, though their dialect is that of the Togiagamute. There is one peculiarity of the people just described which they have in common with the inhabitants of the Lower Kuskokwim. I refer to the surprising indifference in regard to the quality of their drinking water, as they drink the water of brackish lagoons, full of offal of fish, seal, etc., even in localities where running water of better quality is quite convenient. The hunters who proceed to sea in their kaiaks in pursuit of the seal or of the beluga take with them only a dipper, and quench their thirst with salt water. I had occasion to observe this peculiar custom even when I had with me a supply of fresh water, of which these natives might have partaken.

The accompanying plate represents a burial place near the mouth of the Togiak River.

The Nushegagmute.—The Nushegagmute, also known as Kiatagmute, are confined strictly to the valleys drained by the Nushegak River and its tributaries. In outward appearance they resemble their neighbors already described, but their manners and customs have been somewhat changed by long contact with the Russians and the location of the missionary station at Alexandrovsk, on the mouth of the river. The men are hunters of considerable skill on both land and water. The natives inhabiting the head waters of the river and the lake region of the interior are in constant communication with the Athabaskan tribes. All the natives of this tribe are carried on the register of the Russian missionary, and consequently are nominally Christians, although still addicted to their old pagan customs and festivals. During a favorable season the outlying settlements receive an annual visit from the missionary, whose influence does not extend much beyond the baptizing of infants and the marriage of such couples as visit the mission station. The interior of this region being generally wooded, the dwellings of natives are somewhat larger and more comfortable than those of the coast people. The inhabitants of the immediate vicinity of Alexandrovsk and the seacoast have been strangely mixed by immigration from the westward and northward, and we find here families from the Kuskokwim, from the Yukon Delta, and even from Norton Sound, the latter of the Mahlemute tribe. Many of these strangers are engaged in walrus hunting along the shallow coast and about the outlying islands. Here, as on the Kuskokwim, the natives within the reach of tide water use the Eskimo kaiak exclusively, while those of the interior have birch-bark canoes. The men are all skillful carvers in ivory, and both males and females take part in the scenic performances connected with their many festivals. The kashga, or kashima (the latter a Russian term), is found in every village, and is used as workshop, bath, and assembly room alternately.

Great care and pains are bestowed upon their masks and scenic representations by these natives, as well as by the neighboring tribes. The actors in the scenes represented always array themselves in their costumes and masks out of sight of the spectators, generally in that part of the kashga partially covered by the flooring, ascending through the fire hole like actors from a trap in the stage. A change in the action is generally accomplished behind skins held up as a screen, and every participant in the performance does his utmost to act his part as true to nature as possible. During representations of combats between men, and between men and animals, bladders filled with seal's blood are concealed about the person in order to give a realistic representation of the flowing blood. Stuffed animals introduced on such occasions are generally moved about quite naturally by hidden strings and cords, and carved birds flap their wings through the same agency. The majority of the masks have movable eyes and jaws. In fact, these performances afford a striking contrast to the dramatic scenes enacted by the Chinese, who boast of the oldest civilization of the globe. A learned Chinaman, with the red button on his cap, the proof of having passed the most difficult examinations, will stand in the auditorium of a Chinese theater crowded to suffocation, through a five or six hours' performance on the board stage, where everything in the way of scenery consists of a few dry-goods boxes and a stool or two; where changes of scenery are denoted by placing a small flowerpot on one of the dry-goods

boxes to represent a garden, and placing an inkstand to indicate an office or a court room; where a criminal about to be executed is touched with a paper sword on the side of his neck, and walks demurely off the stage in full sight of the audience; where a man about to be murdered walks out and brings in a miserable dummy and holds it up to be slain in his place; while among these savage tribes every detail pertaining to their representations is attended to with patience and care, exceeding even those bestowed upon such matters on our provincial stages.

The Aglemute.—This tribe numbering but a few hundreds, inhabits the north coast of Aliaska Peninsula, down to the Ugashik River, where the Aleutian settlements begin. The Aglemute also are Christians, but, like their neighbors, retain all their former customs and superstitions. Their villages are all located on the seacoast, with the exception of one at the head of Lake Walker. The natives of the coast villages are walrus hunters, and occasionally put out to sea in pursuit of whales. They are equally skilled in ivory carving with their northern neighbors, the difference between them being almost purely dialectic. The latter circumstance is probably owing to the fact that the Aglemute have lived from time immemorial upon the portage routes between Bering Sea and the north Pacific, across the Aliaska Peninsula. The people of the easternmost villages on Lake Walker even now maintain a more constant communication with the Kaniagmute of Katmai across the mountains than they do with their kinsmen on the coast of Bering Sea. Among the Aglemute also traces of immigration from distant tribes exist. I found on the Naknek River, the outlet of Lake Walker, a family hailing from Ikogmut, some 200 or 300 miles up the Yukon. Their immigration had taken place quite recently, and they still remembered many of the people in their old home by name. In former times there existed another element among the Aglemute—Aleutian invaders, who for some time inhabited two settlements on the mouth of the Naknek River. As far as can be ascertained, the Aleutians retreated down the peninsula as far as Oogashik at the beginning of the present century. In their garments the Aglemutes do not essentially differ from their western and northern neighbors, though they make use of reindeer skins for their winter garments, these animals being quite plentiful in their country.

The Kaniagmute.—Crossing the mountains from the country of the Aglemute, we enter the territory inhabited by the most important among the Eskimo tribes of Alaska, the Kaniagmute (Koniagimute or Kadiaktzi of the Russians, Kikhtagimute of the Aglemute, or the Ultz chna of the Athabaskans of Cook Inlet). The Kaniagmute were the first Eskimo tribe with whom the Russians came in contact, and their first meeting was not of a friendly nature. Before the Muscovite traders had become more intimately acquainted with this tribe they classed them as Aleuts, on the strength of their outward resemblance to the latter, and such they were called as long as the country remained under Russian rule, though scientific men knew long ago that the Aleut belonged to a different tribe from this. Our earliest knowledge of the Kaniagmute is based upon the reports of Golovief, the Russian who landed on Kadiak in the year 1762, and of Shelikhof, who established the first permanent settlement on the island. The latter, whose personal investigations among the people extended over two years of residence, in narrating the events of his voyage, wrote as follows:

> The Kaniags (Kadiak people) are tall, healthy, and strong, generally round-faced, with light-brown color; the hair is black, seldom dark brown, and is cut off around by men and women. The wives of some of the more prominent natives comb a bunch of their hair forward over the forehead and cut it off at the eyebrows. A few of the men have beards, and both sexes frequently tattoo the breast and shoulders in imitation of neckerchiefs. Men, women, and young girls pierce the partition of the nose as well as the ears and under lip; the latter disfigurement often assumes the size and shape of a second mouth. Through the hole in the nose a small stick or bone is worn, and bead ornaments are placed in the ears, mouth, and nose. The men do not cut their beard. They have no shoes, going always barefooted, and at home entirely naked, with the exception of a small apron of skin. They wore parkees of the skins of beaver, otter, fox, bear, birds, ground squirrels, marmot, marten, rabbit, reindeer, wolverine, and lynx. Their rain garments are made of the entrails of sea lions, seals, and whales. On their heads they wore hats made of spruce roots and grass; also wooden caps, bent or curved, of one piece.
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> In the chase of marine animals they used spears that were thrown from little boards, but in war times they used bows and arrows and lances, with points of iron, copper, bone or stone. They have iron hatchets of peculiar shape, also pipes, knives of iron and bone, iron needles (until our arrival the women made their own needles of bone); thread made of sinews; dishes made of wood, of the horn of mountain sheep, of clay, and stone. Their boats

were bidars covered with skins. They catch fish at sea with bone hooks, the lines being very long and made of dried seaweed, the seam of one kind of seaweed being sometimes 40 fathoms long. In the rivers they catch their fish by means of weirs and dams, killing them with spears. They make fire by friction, and use stone lamps for lighting filled with the fat of seals, bears, or sea lions, and provided with wicks of grass.

Of their marriages I know nothing, nor can I say anything of their new-born children, except where the name is given from the first object in view, be it animal, bird, or anything else.

The burial customs differ in the various tribes of the Kaniag. I have not witnessed these ceremonies, but I have been assured that some deposit the corpse, together with the most valuable possessions of the deceased, in a small canoe, and cover it with earth; others inter at the same time with the deceased a live slave. The Kenaige (Kenaitze), however, burn the corpse, together with a number of skins presented by relatives for the purpose.

During the mourning for their dead relatives they cut the hair of the head and smear the face with black pigment; this they do only for relatives such as father, mother, brother, sister, and others especially beloved; sometimes also if a stranger for whom they have felt great friendship. If the deceased has been in bad repute or quarrelled with his relatives, the latter do not go into mourning.

Epidemic diseases I did not notice among them; they did not know anything of smallpox. They are of healthful habit, and live to a hundred years.

These natives go to meet arriving visitors dressed in their best and painted red, beating drums and dancing to the time with arms in their hands; the visitors approach in order of battle. As soon as the canoes are near enough the host and hostess wade into the sea up to their breasts and drag the canoes ashore as rapidly as possible; then they hurriedly assist the guests out of the bidarkas and carry them singly on their backs to the place appointed for their reception; here they all seat themselves, but perfect silence reigns until everybody has eaten and drunk his fill.

The first and most important ceremony consists in partaking of cold water, and then the children and youths bring on the various dishes, consisting of blubber, a hash made of fish, seal, whale, and sea-lion meat and blubber; the next, berries of various kinds served with oil; then roots mixed with berries and dried fish, and finally meat of animals and birds. Salt is unknown to them. Of every article of food the host must taste first. This made me believe that they had a knowledge of poison. When the host has tasted from a dish he hands it to the guest at his right; he helps himself and then passes the dish in the order of rank. If anything remains on a dish it is passed back to the first, who gathers the remnants and puts them by to take with him on his departure. The meal finished, conversation begins, and when all the news has been exchanged dancing and singing are indulged in to the music of drums and rattles. Some don masks of grotesque patterns made of wood and painted. When the guests are dressed they are carried by the host to a large hut; this building resembles somewhat a temple of irregular and barbarous architecture. Here the real entertainment begins. As long as the guests remain, singing and dancing and pantomime are continued; when tired they go to sleep, but when they awake the entertainment goes on, ending only with the termination of the visit. On taking leave both parties make presents to each other, and perhaps do a little trading. In these large buildings all of the councils, consultations, and assemblies are held; and whenever anything of importance is going on the female sex is excluded.

[The Kaniags and Chugach have one language, but the Kenaige are entirely different in both language and customs.] The people live in subterranean dwellings, the walls of which are lined with planks; the window openings are on top, covered with bladders of various animals; the entrance is from beneath. They have no fireplaces, and make no fire, because it is warm enough without. Their bath houses are similarly constructed, and heat is produced with stones heated in a fire outside; here the natives rub themselves with bundles of grass and twigs. These baths are very hot, but no steam is used. Each settlement has a common kitchen, with doors or openings all around. Whoever steals most frequently and successfully is most respected. They do not have many wives—seldom a man has two, but the good-looking and active women sometimes keep two and three men without any appearance of jealousy among them.

They have no vehicle on land and no draught animal, and though dogs are numerous they are not employed for this purpose.

They have not the slightest conception of a God, and though they say that two beings or spirits exist in the world—one good and one bad—they have no image or likeness of the same, and do not worship them. They are not idolators. Of the beings or spirits mentioned above they know nothing beyond the fact that the good spirit taught them to use bidars, taught them to make bidars; and the bad spirit how to spoil and destroy them. From this fact we can judge of the narrow limits of their understanding. They have, however, a great deal of sorcery and soothsaying among them; they have no law of justice, and everything tends to show that they lead a life differing but little from that of beasts. They are of an ardent nature, especially the females. They are enterprising and cunning by nature, and when insulted they are revengeful and malicious, though meek and humble in outward appearance. Of their faithfulness and honesty I can say but little, owing to my brief residence among them. I have seen examples of good faith and firmness, but also of the contrary. If they are told that they may derive profit from a certain undertaking they spare no pains and dare anything. Altogether they are a happy and harmless people, as is proved by their daily games and frolics; but as they live in constant enjoyment, and neglect their domestic affairs, it frequently happens that they suffer from want of food and clothing.

In ancient times the Kaniagmute settlements extended much farther both north and south than they do now. They carried on constant wars with the Aleutians of the Shumagin and Aleutian chains of islands, and in the north were found by Captain Cook halfway up Cook Inlet

as late as 1778. In warlike disposition, strength of body, and treachery they appeared to the Russians very different indeed from the meek and humble Aleuts; but, once conquered, they became fully as manageable and as easily accepted the teachings of the Russian missionaries, who began their labors among them in 1795. The intermixture of Caucasian and other elements in this district has been so great as to leave but few of the original tribal peculiarities either in outward appearance or in manners and customs. The Kaniagmute and their eastern neighbors, the Chugachimute, are the only sea-otter hunters among the Eskimo of Alaska, and as such naturally become of greater importance to the Russians than their western neighbors, receiving a greater share of attention in every way The manners and customs of the Kaniagmute have been repeatedly described since the days of Shelikhof. First after him came Davidof, a young officer of the Russian Navy, who resided two winters on Kadiak Island, in 1802–03. They were next described by J. H. Holmberg, an ethnologist of some repute from Finland, who embodied much of Davidof's work in his own, which was published about the year 1850. Other Russian and German writers have touched upon the subject. The substance of these previous investigations, together with my own personal observations, are embodied in the following pages.

The Kaniags (Koniag, or Kikhtagmute) are the inhabitants of the island of Kadiak and surrounding islands. They were called Kadiak-Aleuts by the Russians, or briefly Kadiaks. Neither of these two appellations is strictly correct, as originally neither island nor people bore such a name. The name of Kadiak is evidently a corruption of Kikkhtak, a word signifying in the language of the Kaniagmute a great island, and which was naturally applied to the largest island of the group. What may have induced the Russians to call the Kaniags Aleuts, a name first applied to the inhabitants of the Fox Islands, different entirely in language as well as in outward appearance from the former, is not easily explained, unless it was based upon the general similarity of outline existing among the natives of the northwest coast of America. In the course of time the name of Kadiak has been universally adopted, even by the natives of the island, while the younger generation call themselves Aleut, which they pronounce Aleutik; only the aged still maintain that in the days of their liberty and independence their name was Koniag. We find in the Kaniags a people divided originally into commoners and hereditary chiefs. Among the Thlinket the commander or head man, who was much respected, was chosen among the families of chiefs. Under Russian rule this social organization had almost disappeared, but the chiefs or elders (*starshina*) were selected by the Russian-American Company on account of their influence or wealth, and the company also took care to make these selections from families in which chieftainship had been hereditary. They received a salary from the company, and if they held their office for a prolonged period they were presented with a long tunic made of scarlet cloth. A starshina (or elder) dressed in this manner enjoyed among his people a greater respect than is accorded to European nobles with hundreds of ancestors.

The system of slavery was less developed among the Kaniags than among the Thlinket. They held slaves, but their number was small, and the wealth of individuals did not depend upon slaves entirely, as among the Thlinket. The sacrifice of slaves was unknown; they were looked upon only as laborers or servants, and their lot was a happier one than that of their Thlinket neighbors. Of prisoners of war only the women and children were carried into slavery; the men (according to the doubtful authority of Davidof) were killed at once, or perhaps preserved for some great festival, to be tortured in view of the whole settlement. The few who survived such torture were permitted to live. The principal mode of obtaining slaves was by barter with the other tribes; but no slaves have existed on the Kadiak group of islands for at least a generation. As soon as Shelikhof established himself at Kadiak the slaves began to flock into the Russian camp, where they found protection, and in return served as bodyguard and scouts for the Russian traders. Later, when the Russians had become firmly established, they confiscated all the slaves and employed them as laborers of the company; at the same time the very name of slave seems to have disappeared, and they were designated by a word imported from Kamchatka, the "kayoor," which signifies day laborer or servant. In the course of time, when the original kayoors had decreased much in numbers, the company made a practice of replacing them with free natives who had committed crimes. It seems that the number of crimes committed always

increased with the demand for labor, and finally the system of universal liability to labor for the company was adopted, from which even children and women were not excepted. In outward appearance a few characteristics distinguish the Kaniag from other tribes of the northwest coast of America. The posterior portion of his skull is decidedly flat, and his stature is considerably above the medium, making him the tallest among his neighbors. Occasionally individuals of gigantic stature are met with; for instance, Davidof claimed to have met with a chief in the bay of Igak who measured 6 feet and 9 inches in height. The dark or nearly copper color of the face or skin is considered by Davidof as not natural, but the consequence of a life of constant exposure; and at the same time he remarks that he saw many white females.

The same observation was made fifty years later by Holmberg, but the white faces always appeared to him to be the result of mixture with foreign blood. The coarse black hair, the small black eyes, protruding cheek bones, and brilliant white teeth are common to all the tribes of the Russian colonies. In former times both sexes wore their hair long, the men's in plaits and the women's in a rough knot or roll on the top of the head, and cut straight on the forehead just above the eyes. On festive occasions it was smeared with whale oil and a red powder made of burnt ocher, and finally strewn with white down, generally taken from the eagle. Of all these modes of ornamenting the hair oiling alone has been retained, and nearly all the men, women, and children dress it in European fashion. The partition of the nose, the lower lip, and the external rim of the ear were pierced for the reception of ornaments, of which the one destined for the nose always consisted of a cylindrical pin of bone 5 inches in length, sometimes replaced with the sea lion whiskers. In lips and ears the ornaments or pendants consisted of small pieces of polished bone, generally pierced and strung upon threads, but after the arrival of the Russians glass beads took the place of these. At the beginning of this century the lip and ear ornaments of the wealthy Kaniag women or a young dandy frequently weighed several pounds.

The dentalium was an ornament much prized by men and women. This shell did not exist in the Russian possessions, but was imported from the British colonies north of the Columbia River, and thence passed from hand to hand along the whole coast as far as the Aleutian Islands. At the time of Davidof's visit to Kadiak, in the year 1802, the price of one pair of these little shells was a whole parkee of squirrel skins.

Davidof also relates a tradition of the Kaniagmute to the effect that in the country of the Thlinket, far to the southward, there was a lake from which the dentalium or hyqua shell was obtained, the mollusks being fed with bodies of slaves thrown into the water—a story evidently invented by the Thlinket to enhance the price of this commodity, of which they had a monopoly.

The most precious ornaments consisted of small pieces of amber that were washed up occasionally by the sea on the south coast of Kadiak, but chiefly on the island of Ookamak. These were pierced and strung and served the women as earrings or pendants. At certain times, after an earthquake, as a rule, the ocean seemed to be more lavish in bestowing this treasure, and then the amber formed quite an article of trade between the Kaniags and the people of Bristol Bay and Nushegak; but as these larger harvests of amber only occurred at long intervals, the value of the article always remained at a high standard.

The lower lip of the women was always pierced twice, but frequently five or six times, the men having only one such orifice. Some dandy in ancient times originated the fashion of making a long, horizontal slit in the under lip parallel with the mouth, but this mode had few followers, owing to the inconvenience of having their food come out at the artificial aperture.

At present only the oldest women of Kadiak Island show traces of tattooing on the chin, though formerly this custom was universal. The mode of procedure was to smear a thin thread of whale sinew with a mixture of soot and oil, and then to draw the thread into the skin by means of a needle, thus forming certain primitive patterns. In ancient times the breasts of the women were also tattooed, and frequently two parallel lines were drawn from the ear to the chin; and if a newly married woman wished to give her husband a proof of great love she tattooed herself on various parts of the body and in the hands.

It was the custom of the Kaniags to paint their faces in various colors before festivities or games and before any important undertaking, such as the crossing of a wide strait or arm of the

sea, the sea-otter chase, etc. The colors most commonly used were red and black, the pigments consisting of oxide of iron and graphite, which are found on various parts of the coast, mixed with whale or seal oil and applied with pointed sticks. After the face has been covered with one color the sticks served to scratch in the still moist foundation figures and stripes, which were either filled with other colors or allowed to retain the natural color.

In former times the clothing of both male and female Kaniags was alike, and consisted of the kamleika and the parkee. Both of these names were introduced from Kamchatka, the native word for "kamleika" being *kanakhliuku*, and for the parkee *atkuku*. The parkee was a long shirt or garment with a small opening at the neck just large enough to allow the head to pass through, and with two short sleeves, which were intended more for ornament than for use, as under each sleeve there was a vertical slit through which the arms were thrust when needed, but commonly these members were kept concealed under the garment. The parkee was made of the skins of birds or animals. Of the former the cormorant, the duck, and the sea parrot furnished the material, and of the latter those of the ground squirrel, the sea otter, the marmot, the bear, and the reindeer were used. After the birds had been skinned the women removed the fatty particles by sucking, and then smeared them thickly with putrefied fish roe and let them remain in this shape for some time. After a few days they were cleansed and kneaded with hands and feet until dry. The skins thus prepared were sewed together with needles manufactured from the bones of small birds and thread prepared by a very tedious process from the dried sinews of the whale. The most valuable of all the bird-skin parkees were those prepared altogether of the necks of the cormorant, worn only by the young women, and a single garment required the necks of from 150 to 200 birds. The feathers of these garments were worn on the outside, and were ornamented with the long hair of the reindeer, strips of ermine, sea otter, and sometimes with eagle feathers. Other bird-skin parkees were worn during fine weather with the feathers inside, and in wet weather these were turned out and served to shed the water. The skin was ornamented with figures and lines in various patterns traced in red pigments.

The ground squirrel, or *spermophilus*, furnished the material most generally used for parkees. The animal does not exist on the island of Kadiak, but abounds on some of the smaller islands. The skins were first cut into squares and then sewed together so that the head and belly formed one side and the back and pendent tail the other, these double squares being then sewed together to make the parkee, which consequently had fur both inside and out. The parkees made of bear, moose, sea-otter, or reindeer skin were always worn with the fur outside. The marmot skins were obtained by barter from the Kenaitze and Chugach, the reindeer skins from the inhabitants of the Alaska Peninsula, and exchanged for sea-otter skins or amber, etc. Reindeer parkees were always ornamented with feathers, beads, etc.

The kamleika is the most important article of clothing worn by the Kaniags, as it protects them against rain and moisture, and without it it would be impossible to undertake any extended voyages in bidarkas. It is made from the entrails of bears, sea lions, or seals, occasionally also of those of the sea otter. These are dried, cut into long strips, and sewed together into shirts with wide sleeves, and a hood, which is drawn over the head until only a portion of the face remains bare. The entrails are prepared in the following manner: They are first turned inside out and all the fatty particles removed with a sharp fragment of a shell; then they are repeatedly washed in salt water or urine, and rinsed and allowed to dry slowly; when dry they are rubbed between the hands until perfectly soft, and then are cut into strips and sewed together. When one of these garments is completed the sleeves and neck are tightly bound and water is poured into the body in order to test its imperviousness. The kamleikas made of the entrails of the bear are considered the strongest, but the material is less plentiful than that obtained from sea lions or seals. Lieutenant Davidof states that in ancient times the skins of the tongue and the liver of the whale were also used for the same purpose.

The garments of the Kaniags as they have been described may still be found among them. The squirrel and bird parkees and kamleikas are still universally worn, but they are now ornamented with red worsted and strips of cloth. When the Russians had obtained a firm foothold in these regions they prohibited the natives from wearing garments made of sea otter,

bear, or other valuable furs. At present the parkee is worn only out of doors, while indoor shirts of cotton, dresses of calico and drill, and trousers of coarse cloth or linen are in common use. Hats and caps of American manufacture have almost superseded the hat plaited of roots and highly ornamented with beads, dentalium, sea-lion whiskers, and figures in black, red, and blue colors. A blue color, consisting of small fragments of ore which are ground to powder, is obtained by barter with the inhabitants of the Aliaska Peninsula. In applying these pigments it was the custom to open a blood vessel of the nose with a sharp piece of shell and to mix the color with the blood to the proper consistency, the Kaniags claiming that such a mixture was more durable than colors prepared with oil. In painting paddles or oars this method was generally adopted. If the bleeding did not cease speedily the cut was sprinkled with ashes. In ancient times the hat was ornamented with an elaborate piece of embroidery, the work of the women, sometimes representing a bush with birds, but this has entirely disappeared. Before the arrival of the Russians the inhabitants of Kadiak were barefooted, but they soon adopted the torbassá (boots of seal or deer skin), imported by the Russians from Kamchatka.

In his choice of food the Kaniag is still less particular than the Thlinket, and in addition to the articles composing the diet of the latter he consumes a number of disgusting and unclean things that no other tribe would look upon as food. As a sample of this I instance the fact that after killing a bear they empty the stomach and entrails of their contents and boil them with berries; this is done chiefly at a season when the bear also lives upon berries. This disgusting habit can not be traced to necessity, as food of all kinds abound at that time of the year. It may be stated briefly, but truly, that the Kaniagmute eats anything and everything from the toughest root to the most disgusting worm of land or sea.

The principal means of subsistence, however, is fish. During the summer season it is generally cooked before being eaten, but during the winter the air-dried fish is eaten raw more frequently than cooked. The drying of the fish is done in the open air, and nothing hinders flies and other insects from depositing their eggs therein, which speedily develop into maggots.

The dried fish is generally stored in the dwellings, being piled up along the walls; but if the supply is great it frequently happens that the floor is covered with them several feet high, and the family live on the top of their food until they gradually eat their way to the floor. Among the greatest delicacies of the Kaniag are the meat and blubber of the whale; no other article of food, be it fish or flesh, seems palatable to him without being dipped into oil, and if the supply is ample he drinks the latter pure. The capture of the whale always marks an epoch in the season, people hastening from distant settlements to assist in cutting up the animal. It is the custom to present such assistants with one-quarter of the whole animal, and consequently there are but few idlers, and the operation is concluded with astonishing rapidity. On the island of Afognak Holmberg witnessed the cutting up of a whale, and testified to the fact that in two hours nothing but the bare bones remained on the beach. The blubber as well as the meat is cut into long, narrow strips; the meat is boiled, but is seldom consumed fresh, being deposited in excavations in the ground, where it undergoes a process of putrefaction, and where, according to a Russian expression, it "becomes sour," before it is considered fit to eat. The blubber was formerly reduced to oil in the following manner: It was first cut up into very small pieces, then the old men and women and children who could not assist in the cutting masticated the fragments and spit out the juice into a large dish or kettle; subsequently this liquid was boiled and preserved for future use. Frequently the blubber is mixed with berries or with the boiled roots of the wild garlic, and put up in bladders for the winter.

It frequently happens that a long time elapses between the killing of a whale and the capture of the carcass, and under such circumstances the consumption of the meat causes disease and sometimes death. The Kaniags, however, claim to be able to decide whether the meat is still fit to eat by observing the gulls and other aquatic birds that swarm about the carcass; and if a certain species of bird is absent the Kaniag will not touch the meat.

A variety of wild celery (*cicuta*) also forms a favorite article of diet with the Kaniags; the outside of the stalk being removed with the teeth and the soft pulp inside eaten. Lieutenant Davidof also stated that the roots of certain ferns were preserved in oil and eaten.

In cases of necessity the Kaniags are able to go without food for a long time, and they never load their stomachs before exertion of any kind. After labor has been performed they give full sway to their gluttony, and their voracity borders upon the marvelous. The following incident, related by Holmberg, may serve as an example:

> While circumnavigating the island of Kadiak in a bidarka I was compelled by bad weather to remain in Killuda Bay for three days with my six oarsmen, and occupied the house of a native who was engaged in fishing; the only occupation of my men at that time was to eat and to sleep. Before sunrise in the morning a kettle of "yukala" was on the fire, and each man devoured two fish; early in the forenoon our host gave another fish to each of the men; this was eaten raw with whale oil; at noon a supply of fresh salmon was brought in, and 16 of these were boiled and eaten by my crew; in the evening the morning meal was repeated, so that during daylight each man had devoured at least seven fish, and what they consumed during the night I could only surmise.

After returning to Pavlovsk harbor, Holmberg related the incident to Mr. Murgin, the agent at that place, somewhat apprehensive of being disbelieved, but his story was received only with hearty laughter, and in return he was favored with a similar anecdote which threw his experience altogether in the shade. Mr. Murgin, during a bidarka journey encamped upon an island late in the evening, and immediately after landing an immense bear was killed by his men. Murgin went to sleep, and, after resting six hours, he was asked to embark again. Seeing no sign of the bear about the camp he asked what had become of it; the reply was, "We have eaten him up." Six men had devoured the huge bear within a single night. I myself, also, witnessed the devouring of two 50-pound halibut by six men between 10 a. m. and 6 p. m., while delayed by bad weather on Kadiak Island.

As already mentioned, mussels are a favorite article of food with the Kaniags, but it seems that these also are poisonous in certain localities or at certain seasons. One instance is on record where a large number of sea-otter hunters perished from eating mussels in what is now called Peril Strait, in the vicinity of Sitka. An old man named Arsenti, who was present at the time, gave Holmberg the following account of the disaster:

> Soon after the new fort had been built at Sitka I was one of a sea-otter party which had been ordered to winter in Sitka, but when they arrived there Medvednikof, the commander, informed us that he had provisions only for half the party, and that the other half must return to Kadiak; I was among those who returned. When we passed through the straits we had no fish and were compelled to eat mussels, and a few hours later more than one-half of our men were dead. Death took hold of me also, but I remembered the advice of my father to eat raw sticklebacks; I did so, vomited, and was cured.

Previous to their acquaintance with the Russians the Kaniags undertook to make an intoxicating beverage by distilling alcohol from the fermented juice of raspberries and whortleberries, but this was prohibited by the Russian Company. Now they all know how to distill alcohol from flour, sugar, and molasses. The use of tobacco has become univetsal, especially in the shape of snuff; and among other articles of luxury tea and sugar are the most important.

Holmberg expressed his astonishment when he arrived at a Kadiak settlement and learned that the inhabitants numbered from 200 to 300 and lived in only 10 or 15 dwellings; but when he entered one of these houses and beheld the crowded mass of old and young, the matter was easily explained. Each hut was inhabited by three or four or more families; the interior consisting of one common apartment, or cooking or living room, and three or four small partitions to form sleeping rooms. The walls consisted of planks planted perpendicularly in the ground, slightly inclined inward. The rafters generally consisted of whale ribs, which were covered with sticks of driftwood, and a thick layer of sods placed over all. The floor was strewn with dried grasses, and in the middle of it was the fireplace, corresponding to an opening in the roof. Along the walls all the provisions and utensils were piled promiscuously; and all kinds of offal with a penetrating odor of whale oil made the interior exceedingly disagreeable.

The sleeping compartments are generally so low that one can not stand upright within; they are lighted up sometimes by a small bladder window in the roof. Small as these compartments are, they serve as sleeping rooms for several families to stretch out promiscuously upon the plank floor without covering of any kind. One of these little compartments is used as a steam-bath room, for which steam and heat are obtained by means of red-hot stones, over which water is

poured; and after the Kanaig has been thoroughly steamed he runs into the sea or river to wash himself, in winter as well as in summer.

The Kaniag canoes are remarkable for fine workmanship and graceful form. They consist of a slight frame of light wood tied together with whale sinews and covered with seal skin, with the exception of an opening for the oarsmen, and are made with one, two, or three openings. Each kind has a different name, but are all known as kaiaks. The three-hatch kaiak is called the bidarka (*paitalik*); the two-hatch canoe is called *kaiakhpak* (big canoe), and the one-hatch canoe, *kaiangvak*. The two-hatch canoes are most generally used at Kadiak. Over each hatch a waterproof apron is fastened (called by the Russians *obtiashka* and by the natives *akvilivak*), which the inmate draws up to his armpits in bad weather, securing it tightly about his chest. The Kadiak bidarkas differ in form from those of other coast tribes, being shorter and broader than those of the Aleuts, and the paddles have but one blade. In addition to these canoes they have so-called "bidars" (*angiak*), much larger and of different grade. The framework for these is constructed similarly to that of the canoe, but is not covered on top, and resembles our boats in shape. They were formerly used principally in times of war and for long journeys, as they hold easily from thirty to forty persons. Oars are used to propel them, and sometimes masts and sails. At present nearly all these crafts are in the hands of the traders.

The Kaniags are possessed of great skill in carving figures and other objects from walrus tusks, the material being obtained from the Aliaska Peninsula. They also make very nicely carved snuffboxes of whalebone. Formerly all these objects were worked with stone implements, but the use of iron has long been known to the Kaniags, who used it at the arrival of the Russians. The savages said that iron was occasionally cast upon the beach by the waves [*sic!*]. The stone implements consisted of hammering wedges and axes made of hard graywacke, knives made of a hard kind of stone, similar in shape, and provided with wooden handles; and tools made of shells served to smooth or polish surfaces. We still find on Kadiak many stone lamps manufactured in ancient times, and roughly fashioned by partially scooping out a piece of large stone. Oil was poured into this excavation, and twisted moss and grass served as wick.

The women are equally skilled in handiwork, especially in all kinds of needlework, making and adorning garments, covering the canoes, etc. They also make bags of the entrails of seals and whales, and ornament them with feathers and beads of worsted. These bags are waterproof, and protect their contents against moisture. The Kaniag women also make baskets and hats, but do not equal the Thlinket women in this respect; they excel, however, in all kinds of embroidery.

The general mode of life of the Kaniags in former times much resembled that of all the coast tribes of Northwest America. In the summer they occupied themselves with the chase and the fishery, and the winter was spent in idleness until hunger compelled them to renew their efforts. In former times all the great festivals consisted of gambling, dancing, and feasting in the winter, but the custom has become nearly obsolete. At the beginning of this century Lieutenant Davidof witnessed such festivals.

The sea about Kadiak Island is exceedingly rich in fish, the most prominent among them being the salmon, of which six species are distinguished; the redfish, the kishutch, the gorbusha, the chavicha, the khaiks, and the goletz, or salmon trout. Each of these species throng the bays and streams at certain seasons of the year, and are easily secured with spears. The natives know so well the time at which each stream or river is visited by certain species of salmon that they rarely make a mistake of a day in their calculations, generally shifting their quarters to such localities just in time for the proposed catch. Of late they have begun to use seines made of whale sinews. Halibut and codfish are caught with hooks similar to those of the Thlinket.

Their arms and implements consist of arrows and spears, the former propelled with bows and the latter from a board. All these are made of the wood of the spruce and the Douglas pine, the latter being quite common among the driftwood. The bow is about 4 feet long and has a string of whale sinew. The spear board is about 18 inches long and serves to give an impetus to the spear in throwing it. I noticed among the Kaniags six different kinds of arrows and spears used for the chase of different animals.

Formerly the most important pursuit of the Kaniags was the chase of the whale. Only one

species of this animal is known to visit this region, but according to their age the native designate them by different names. The classification of whale adopted by the natives is as follows: First, the old or the full-grown whale they call *annikvak;* the half grown, *kavoikhnak;* the third, the yearling, *agashitnak*, and the fourth, the calf, *akhvak*. Of these the yearlings and calves are hunted almost exclusively.

In the month of July the whales begin to make their appearance in the bays, following up the small fish and mollusks upon which they feed. Some bays are visited several times during the summer, and the hunt continues sometimes as late as August. For a successful chase calm, clear weather is necessary. On such occasions the two-hatch bidarkas leave the beach at early dawn for the bay where whales have been observed. Of the two men in each bidarka only the one in front is a whaler, the other acting as his assistant or oarsman, having nothing to do but to propel the canoe in accordance with the other's orders. Having approached to within a spear throw of a whale the man carefully notes the direction in which the animal dives and calculates to a nicety the spot where he will probably emerge. If he is fortunate enough to come within 20 or 30 feet of the rising monster the whaler throws his spear, aiming at the middle fin at the back, and as soon as the spear has been thrown the canoe is propelled away as rapidly as possible, in order to escape the violent movements of the wounded whale. It is principally on account of the danger of capsizing that two canoes always go together.

The spear is about 6 feet in length, with a slate point. As soon as this point strikes the whale it breaks from the shaft and remains in the wound. The contortions of the animal only assist in forcing the missile deeper and deeper into the yielding blubber. Upon the point of his spear each hunter carves his mark to enable him to claim his quarry. As soon as the whale is wounded he makes for the open sea, where, as the natives say, he "goes to sleep" for three days. On the fourth or fifth day the carcass is cast upon the beach; but if the waves and currents are unfavorable this may occur in a locality remote from the killing place; and it is stated that on several occasions whales that had been killed at Kadiak were secured by the people of Oonalashka. In ancient times the pursuit of the whale was accompanied by numerous superstitious observances kept a secret by the hunters. Lieutenant Davidof states that the whalers preserved the bodies of brave or distinguished men in secluded caves, and before proceeding upon a whale hunt would carry these dead bodies into a stream and then drink of the water thus tainted. One famous whaler of Kadiak who desired to flatter Baranof, the first chief manager of the Russian colonies, said to him: "When you die I shall try to steal your body," intending thus to express his great respect for Baranof. On the occasion of the death of a whaler his fellows would cut the body into pieces, each man taking one of them for the purpose of rubbing his spear heads therewith. These pieces were dried or otherwise preserved, and were frequently taken into the canoes as talismans.

These observances are no longer in use, but there is still much superstition connected with the pursuit, and the greatest secrecy is observed in regard to it. Only once had I occasion to notice anything of the kind. This was in the settlement of Killuda, where I entered a hut, in the corner of which a young woman lay covered with bearskins. I asked if the woman was sick, and learned that her husband had gone to hunt whales, and that the wife was obliged to remain prostrate without food until his return in order to give him good luck. These people are at least nominally Christians.

The sea-otter chase is now conducted altogether by large parties of from 80 to 100 two-hatch canoes, which assemble at the beginning of May and proceed to distant hunting grounds. It is necessary to await a perfectly calm day, when all the canoes leave the beach together, forming a long line. As soon as an otter is sighted by one of the men he elevates his paddle as a signal, when a circle is immediately formed by 10 or 15 canoes around the spot where the sea otter is expected to rise. When the animal has received the first arrow it dives immediately, but a new circle is formed and the otter is prevented from escaping until, weakened with loss of blood and exhaustion, it finally falls an easy victim.

The sea-otter arrow of the Kaniags is of fine workmanship, and consists of a shaft about 2 feet in length, with a headpiece of bone 6 or 7 inches in length, which by its weight keeps the

arrow upright in the water. The point of the arrow is also of bone and is very sharp; it is secured to the shaft with long strings, but is not attached to the headpiece, being set only into a mere socket. When the sea otter is struck the point remains in the body and the shaft impedes the motion of the animal in diving. These bone points are also marked by hunters, and as the otter is rarely killed by a single arrow, usually requiring as many as four or five, the rule is that he whose arrow enters nearest the head becomes the possessor of the skin.

The sea throws up on the shore of Kadiak a so-called sea bean, which was greatly prized by the sea-otter hunters and secured by them as a talisman. Holmberg once offered a man 40 paper rubles ($8) for one of these beans and was refused.

The spears used for hunting seals are larger than those just described, and are provided with inflated bladders to serve as buoys; and the bird spears and arrows have three or four thin prongs of bone.

The habits and customs of the Kaniags, their shamanism and religious views, have undergone great modifications. The introduction of the Christian religion and the rudiments of civilization, as well as the compulsory labor exacted by the Russian company, has done much toward eradicating the traces of former belief and amusements. Only a few old men and women preserve some confused recollections of the heroic age of the people, and these are not easily induced to communicate their knowledge to strangers.

Polygamy was formerly common among the Kaniags, a wealthy man frequently having five wives. Their marriages were accompanied with but little ceremony. The young man proceeded to the father of his chosen, and, after obtaining his consent, was obliged to carry wood and heat up the bath; then both he and his intended father-in-law bathed, while the relatives of the bride assembled for a feast. On emerging from the bath the young man adopted the name of his father-in-law and delivered his presents, taking away the bride to his own home. The first wife always had a preference above all others; and property descended first to the brother, and from him to the son of the deceased who had been previously selected by him as heir.

The position of the women at Kadiak was not as inferior as with most tribes of North America; they frequently enjoyed great respect, and had the power of maintaining "assistants" with the consent of their husbands. The "assistant" had no rights as such excepting in the absence of the original husband, and altogether his position was more that of a servant who carried the wood and water, gathered mussels, fished and hunted, etc. This custom was more common among the Kaniags than among the Thlinket.

We find among the ancient Kaniags the same cruel treatment of the young women at the age of puberty which prevails among the Thlinket. At this period the young girl was led into a hut, in which she was compelled to remain for six months in a stooping position upon her knees. After that the hut was enlarged sufficiently to enable the captive to straighten her back, but in this position she had to remain another half year, and was considered unclean and an outcast with whom nobody was allowed to communicate during all this period. At the expiration of the term of seclusion the parents prepared a feast and introduced their child as a marriageable young woman.

The dead were wrapped in seal skins, and if they had been wealthy were buried with spears, arrows, canoes, and skins, and, with singing and weeping over the grave, were praised in accordance with their deserts. On such occasions the relatives cut short their hair and dyed their faces black. After the death of a rich man the widow gave a feast, frequently consuming all the property he had left, the people believing that every man became a spirit after death; and if such a spirit revealed himself to his relatives it was considered a sign of good fortune. The house in which a man had died could no longer be inhabited, and was torn down and a new one erected in its place. Dead shamans or sorcerers were laid with all their implements and insignia in bidarkas, these being generally deposited upon a steep cliff or occasionally in a cave. The memory of the dead was honored in a feast, during which distributions of presents were made and the praises of the deceased were sung.

The Kaniags were inveterate gamblers. They frequently lost all their possessions in a game they called "kaganagah," which was played as follows: Two seal skins were spread out at a distance of 8 or 10 feet from each other, and a flat, round piece of bone about the size of a silver

eagle was deposited upon each, the edge of the disk being marked with four black dots. The players, whose number was never more than four, but generally two, divided into two parties, and each put up some article of value. Each gambler had five wooden disks, and these he threw from the edge of one skin to the other, trying to cover the bone disk. When all the disks had been thrown, the players examined their relative positions. If the bone disk had been covered, the lucky thrower received from his opponent three bone sticks or marks; but if he had covered only one of the black dots of the disk, he received two marks, and the wooden disk which had fallen nearest to the bone procured for the thrower one mark, and the marks were subsequently redeemed with valuables.

Among the Kaniags there were always a few individuals who possessed some knowledge of medicine, and knew certain herbs, which they applied in decoctions internally or externally. They were quite successful in blood-letting, which they accomplished with lancets made of shells; and they also performed more important operations, such as the cutting out of spearheads, etc.

The festivals of the Kaniags began with certain secret ceremonies to which women and children were not admitted. Bundles of dry grass were ignited, and prayers imploring the spirits to give success to the hunters were chanted. Then the men emerged from the kashga (kashima, or council or dance house), and the whole population of the settlement ran about with lighted torches. This was the signal for the real beginning of the festival, which was open to all, and lasted as long as the provisions for entertaining the invited guests held out. Boys and girls could not attend until they had been introduced by their father, who on this occasion cut his best garment to pieces, giving away the fragments to the multitude in memory of the event. In the absence of the father, the mother or other relative could take his place.

The council house or kashga in which the festivities took place was the property of the whole settlement. At the end of the festival the building was sometimes destroyed, and erected anew the following year. Sometimes a Kaniag cut his best garment into pieces at the end of the feast, giving the fragments to the guests in recognition of the honor of their visit.

These festivals consisted chiefly of gorging, dancing, and singing. In the diary of Lieutenant Davidof we find the subjoined description of two of such festivals among the Kaniags:

To-day, the 8th of December, 1802, we were invited to a festival, and at 8 o'clock in the evening we proceeded to the kashima, where several spectators were already seated in one of the side compartments. On entering we were struck by almost insupportable heat, there being 60 persons of both sexes seated upon the benches and floor of the small room. The men had all doffed their parkees on account of the heat, and some were entirely naked. The actors in the performances represented hunters about to set out on an expedition. About a large stone lamp that was burning in the middle of the room several men with drums were seated. These drums were of different sizes, the largest being in the hands of the one who acted as leader. On each side of the lamp sat two girls dressed in kamleikas and decked with ornaments. They had a long piece of bone through the partition of the nose, pendants of glass beads through the lower lips and ears, and the hair powdered with eagle down. Beside these sat two men with rattles in one hand and a paddle in the other. The rattles consisted of double hoops to which the beaks of birds are fastened, producing a loud noise at every movement. Upon the blades of the paddles fish and marine animals were represented. The faces of these two actors were painted red, and the head as well as the back was powdered with eagle down. They wore a headdress of bent twigs; one of these twigs passing through the mouth like the bit of a horse. The faces were almost concealed with feathers and fern leaves. The men with the drums wore hats with feathers, arrows, and spears; a minute bidarka constructed of skins, and implements of the chase, were hanging from the ceiling above the actors, and all these objects were set in motion occasionally by means of a spring in the hands of a man seated at a distance. This man was dressed only in a kamleika. The ceiling as well as the floor was covered with dry grass. The two men seated near the lamp began to beat their drums with sticks; the hunters with paddles in their hands and swinging their rattles in time, and all singing in good voice with but little change of tune. The leader managed the song; whenever the drums beat faster, the singers began to shout, and all the spectators joined in. The two girls grasped their kamleikas in their hands and swayed from one side to the other. The leader occasionally shouted a few words, such as "Look there! The shore! Let us embark there! He who has not killed anything will see the animals now," etc. Whenever the word "animal" was pronounced, all the spectators joined in the great noise, imitating the voices of the different animals. Boys were blowing whistles, and the noise was deafening. At every interruption of the song the hunters swayed back and forth and plied their rattles. In the meantime trays with food were carried into the kashima and placed around the lamps; the dishes consisted chiefly of berries and oil; a stone marked with red dots had also been deposited near the lamp; this was said to represent the coffin of the distinguished men in whose memory the festival was given. I could not wait the end of the performance, as I suffered with a splitting headache caused by the heat.

On the 18th of December I attended another festival in the kashima. At first five men, all in different costumes and masks, some of them adorned with ferns, appeared one after the other, the blue thistles attached with a thread to the partition of the nose, and went through the most wonderful contortions. One was painted red, another black; two were attired in parkees, and the fifth in a kamleika; all had rattles in their hands. The first two and the one in the kamleika also had a garment of feathers hanging down to the knees near the lamp; two men in their ordinary costume were seated. I could not ascertain the meaning of this performance. The interpreter said they were men who had devils who betrayed the men, but he did not appear very certain about it himself. All the knowledge of traditions connected with festivals and of the spirits is confined to certain men who are called by the islanders kassiati—that is, wise men, who invented such representations and occasionally relate instances of the ancient history of Kadiak and adjoining islands, and the actions of spirits. If a Kaniag can not or will not answer a question he says "the kassiati knows." After the devils had finished their contortions and disappeared the men began to drive out the women and children. This is generally done after a feast to which guests from distant settlements have been invited in order to talk over matters of importance, but on this occasion this could not be the motive, and the expulsion of women and children could only be attributed to some superstition. When the house had been cleared a man dressed in a kamleika appeared with a peculiar mask before his face and rattles in his hands. He represented the evil spirit, and shouted and ran about in time to a song and beating of the drums.

The wars of the Kaniags in ancient times consisted altogether of ambuscades and surprises, and prisoners were sometimes tortured and sometimes kept as slaves. The wars were chiefly confined to their own tribe, and it is stated that at the time the Russians appeared these internecine quarrels had become so general that during the summer the inhabitants of small settlements entrenched themselves upon steep rocks surrounded by the water. I have seen several such fortified places, and this precautionary measure is easily explained when we consider that during the summer nearly all the able-bodied men are scattered over the hunting and fishing grounds, and those who remain in the settlements are not able to defend themselves against sudden attacks.

An old man named Arsenti Aminak related to Holmberg the story of the discoverer of the island of Ookamak as follows:

The island of Ookamak belonged to my father. He was a very rich chief, as there were ground squirrels on this island, in the skins of which he drove a profitable trade. But how he came into possession of the island I will tell you. Formerly our people celebrated festivals with songs and dances, during which the guests were feasted and presented with gifts. For these festivals we proceeded occasionally to the Bay of Igats, and sometimes the people of Igats visited us at Ayakhtalik. Once we were preparing for a feast, many years before the arrival of the first Russians, and before I was born, and among others a relative of my father, with an only companion, set out from the Bay of Igats in a two-hatch bidarka. When they had left the strait between Sitkhalidak and Kadiak islands behind, a dense fog came up, and as the wind changed imperceptibly they became confused and paddled on day and night. When the weather cleared they saw before them an island that they had never seen before. They landed and named it Ookamak. The island was full of sea otters and ground squirrels, and quantities of amber were found on the beach. They remained there a month, and when they left the island the bidarka was filled with treasures. But where to go? They proceeded northward, paddled and paddled until they sighted the mountains of the Aliaska Peninsula, which was strange to them. They arrived at Katmai, the people of which, being Ogalamutes, were hostile to the Kaniags, though they spoke our language. They threw themselves upon the strangers, robbed them of their treasures, and intended to kill them, but a chief saved them on condition that they should conduct them to the island containing such riches. They proceeded to Ookamak in two large bidars, and killed a great number of sea otters with clubs in a very short time. They also killed ground squirrels with spears, and gathered much amber; then they returned to Katmai. As a reward for their services the chief gave our lost men an escort to the crossing place of Yakolik, from whence they proceeded to my father's house at Ayakhtalik, after having been absent six months and having been mourned as dead. My father received his relative well, and in his joy to have escaped from such dangers he made a present of the newly discovered island, with all its treasures, to my father.

Voluble as the old man was in relating the deeds of his people in ancient times he became mute when questioned concerning the old belief of his father. At first he would not speak at all, but finally he said, "I could tell you much, but I fear that it would cause you injury." This threat, however, did not frighten Holmberg, who pressed his demand, obtaining only brief answers to his questions. The little information he gathered is contained in the following:

Shliam Shoa, that is, the master of the world, was worshipped by the Kaniags as the Supreme God; he created the earth and the heavens, but light was not there. He sent two human beings, a brother and a sister upon the earth, and prohibited them to eat grass. The sister was curious to know what might be the result of breaking the command, and said to the brother, "Probably it will be light when we eat grass." The brother advised her to desist, saying that it might cause them injury, and that they would be ashamed to look upon each other's naked body. The sister, however, could not resist the temptation, and began to eat grass, and behold there was light. They became very much ashamed, and wanted to separate. The sister went in one direction and the brother in

another, but they could not hide themselves, and finally returned to heaven. Upon the steps leading to heaven they met and began to love each other. Five children that were born to them all died, to their great sorrow. Just before the birth of the sixth Shliam Shoa came and asked, "Why do you grieve?" They replied, "All children born to us die." "Do not grieve any more," said Shliam Shoa, "I will sing you a song and you shall have children thereafter;" and thus it happened. He sent them again to the earth, and from them the human race sprang. At one time a flood (*aliak*) is said to have destroyed the whole human race, but how the earth again became populated the old man did not know. After a fortunate hunt an offering was made to Shliam Shoa, consisting of some animals, sea otters or seals, but never of human beings. The offerings were also brought in advance to secure good fortune. Iyak was the god of evil. He lived in the earth and also listened to the prayers of men, but he chiefly favored the shamans. When Shliam Shoa is angry at the doings of men he sends out two dwarfs who make thunder and lightning. In the volcanic mountains of Alaska there lived men stronger than the Kaniags, who, when they heat their bath or cook their food, cause smoke and fire to issue from the summits of the mountains.

An old man of the village of Kaguiak told me that when the first Russians landed upon their island his ancestors took them to be cuttle-fish, "on account of the buttons on their clothes."

A list of Kadiak local names from Shelikhof's volume will be of interest when compared with those of the present. He mentions:

Kyktag—now Kadiak.
Iliuda—now Killuda.
Oogashik—not changed.
Ooga-alak—now Oogak.
Chinnigak (big cape)—now Chiniatzk.
Agaiakhtalik—now Aiakhtalik.
Kerluta—now Karluk.
Yukutmak—now Katmai.
Katman—probably also Katmai.

The year began with the Kaniagmute in August, which was called *Kabiakhgun* (the constellation Pleiades was *Kabiakhtakh*).

September was *Tugakhgun* (from *Tugat*, the constellation of Orion).
October was *Kancha-oon* (when grass withers).
November was *Kangushanchak* (snow in the mountains).
December was *Kagliagvik* (rivers freeze).
January was *Agvinikh* (sixth month).
February was *Kypniakhchik* (dried fish in small pieces).
March was *Koigit annit* (river [ice] breaks up).
April was *Manikhchikhvak* (ravens lay eggs).
May was *Manikhchichak* (little birds lay eggs).
June was *Kaioog ya-at* (seals breed).
July was *Manag-khef* (porpoises have young).

The Chugachimute.—The Chugachimute (Chugach of the Russians), or Chughchil-shvit (their tribal name), inhabit the shores of Prince William Sound (or the Gulf of Chugach. They are at present the easternmost tribe of purely Eskimo extraction, numbering less than 500 in all. Their language is almost identical with that of the Kaniagmute, and in their habits, manners, and traditions there is an equal resemblance. Here, as well as among the Kaniagmute, we no longer find the kashga or kashima; the dwellings are nearly always constructed of logs and planks, affording good shelter during the long, cold winter. Living as they do upon a narrow belt of timbered land surmounted by the inaccessible snow-capped alps of the Chugach range, the Chugachimute have become not only skillful sea-otter hunters and fishermen, but also expert mountaineers, hunting the mountain goat (or sheep) with skill, daring, and perseverance equaling those of any Swiss or Tyrolean chamois hunter. These people are all Christians, in name at least, although they have been neglected for many years by the Russian missionaries stationed at Kadiak and Cook Inlet.

By their Athabaskan neighbors of Cook Inlet the Chugachimute are called Tatliakhtana, but, as one of their villages in the northern part of the sound is to-day Tatikhlek, this may have only a local significance. This tribe has always been in contact, both friendly and hostile, with

its Athabaskan neighbors in the west and north, and with the Thlinket in the east, and this circumstance may have aided in making their character more warlike and repellant than that of other Eskimo tribes. Their first English visitors, under Captain Meares and under Portlock and Dixon, had much cause to complain of the treatment received at the hands of these natives. The Russians also had many a battle with them before they could bring them into final subjection. These early visitors report, however, one custom, of which no trace has been found among any other tribes of Alaska, and which has been considered as belonging to the South Sea Islands only. I refer to the exchange of names. Both Meares and Portlock report that they exchanged names with certain chiefs of the Chugachimute, and when Baranof visited Nuchek Island an old man insisted upon exchanging names with the Russian chieftain's dog (Sargach). This was the last instance related of this curious custom, which seems to have been forgotten by the Chugachimute of to-day. In their intercourse with their Athabaskan neighbors, before mentioned, the Tinnats of Cook Inlet and the Atnahs of Copper River, this tribe does not seem to have indulged in intermarriage; but with the Thlinket, their eastern neighbors, such intermixture has been and is going on actively, forced, probably, by the latter strong and warlike tribe. Toward the end of the last century, when these natives first became known to us, another Eskimo tribe occupied the coast as far eastward as Mount St. Elias. These were the Oughalakhmute (Ougalentze of the Russians), Wallamute and Lakhamute of earliest visitors. This tribe, owing to its position, exposed to the constant attacks and encroachments of the Thlinket, has become mixed to such an extent that at the present day the Thlinket element predominates. Thlinket customs and habits prevail; their houses are built of planks, and in the Thlinket style of architecture, with circular openings in front. The fur garments or parkees of the Eskimo have been supplanted by the blanket worn by the Thlinket, and even the manufacture of the kaiak has been abandoned and is now forgotten by this hybrid tribe, occupying the lowlands at the mouth of the Copper River and the coast eastward to Comptroller Bay, cutting off the Atnahs or Copper River Indians from the coast. So complete has been the amalgamation that young men of the Oughalakhmute now employ an interpreter in dealing with their Chugachimute neighbors living at a distance of a few miles from them. The present custom among the Oughalakhmute, and the Thlinket farther to the eastward, of obtaining wives from their western Eskimo neighbors, shows clearly how this encroachment has been accomplished.

The burial places of the Oughalakhmute to-day exhibit the house-like sepulchers of the Thlinket, but as yet without the totem.

II. THE ALEUTS.

The Aleuts (or Unúngun of Dall, the Takha-yuna of the Kinnatz, or Oonángan, according to Veniaminof and my own observation) inhabit the northern coast of Aliaska Peninsula, from Cape Stroganof westward, and its southern coast from Pavlof Bay westward, the Shumagin Islands, and the whole group known as the Aleutian chain, extending from the Shumagins in the east to the island of Attoo in the west.

The term Aleut applied to these tribes and also to some others by the Russians is of an origin somewhat obscure. Various explanations of its derivation have been given by different writers, but it would seem that it can be traced to the river Olutora on the coast of Kamchatka. The people inhabiting the coast near the mouth of this river were called by the Russians Olutorsky. They were known as the only Kamchatkan tribe who hunted whales, and they were called "strangers" by their Koriak neighbors. It would seem quite natural, in view of these circumstances, that the Russian promyshleniks on first beholding the Aleutian natives in pursuit of whales would apply to them the name of Olútorsky. On one of the earliest maps of the Aleutian Archipelago, published by Staehlin, we find two groups of islands, one named Aleutsky, the other Olutorsky, the latter being located near the mouth of the Olutora River. As no islands really exist in that vicinity, an equal right could be claimed for both terms as applicable to the Aleutian chain. The initial *O* of the Russian is invariably broadened into a sound almost equivalent to *a* in farther, and the transition from the Olutorsky to the Aleutsky of the later Rus-

sians would seem easy indeed. The term of *Oonángan* of Veniaminof I have ascertained to be as universally known to the Aleut people as Mr. William H. Dall has claimed for his version of the same, *Unúngun*. This apparent discrepancy may, however, be ascribed solely to an inability on the part of one or the other writer to distinguish between the finer inflections of pronunciation.

Various other appellations of the people have been collected and published by M. Alphonse Pinart, but they are evidently of local significance, and applicable only to the eastern, western, and central groups of the tribe, respectively.

Of the origin of the Aleut we have no very distinct tradition. The distance between the westernmost island of Attoo and the coast of Kamchatka and the Commander Island is too great to permit of the theory of a general migration over this route from Asia. The two islands of Bering and Copper when discovered by the Russians were uninhabited--another point in opposition to the Asiatic theory. All such points of similarity between the Aleuts and Japanese as have been reported, as well as the general Asiatic cast of features observed in many of the Aleut settlements, can easily be explained by the constant intermixture of Aleutians with natives of Kamchatka and other parts of Asia in the employ of the Russian invaders. Certain articles discovered in ancient Aleutian burial caves would indicate that formerly there must have existed a constant and more intimate intercourse between the Aleutian and the Eskimo of the continental coast, as kantags or wooden bowls have been found in such places exactly resembling those manufactured on the coast of Bristol Bay and the Aliaska Peninsula at the present time. Remains of huts built with whale ribs, such as the coast Eskimo erect, have been discovered high up on the mountain sides of Oonimak and Atkha islands. These buildings were probably erected in the immediate vicinity of the seashore as it then was, the islands having since risen through volcanic action, and this also would militate against the theory of the original settlement of these islands from Asia. Another argument in favor of the American origin of the Aleut lies in the fact that the settlement of these islands would seem impossible without the aid of the kaiaks peculiar to the Eskimo tribes. The wide passages between the islands, which must have been still broader in the earliest times, preceding the gradual rising of this chain of craters, could not have been traversed by any craft less seaworthy than the kaiak, as the violence of storms prevailing throughout Bering Sea and the fearful current of tides rushing in great bores through these passages would prevent any other craft from crossing from one island to another.

The theory advanced by Mr. William H. Dall, in the first volume of Contributions to American Ethnology, that the Aleutians built their present homes by passing from island to island on rafts, many thousands of years before the kaiak was invented, would seem altogether untenable in view of the fact that no material for making rafts exists or could ever have existed on the Aleutian Islands and the adjoining portion of the continent.

Among the traditions of the Aleutian people concerning their origin we can not find a single one pointing to immigration from Asia. The traditions on this subject, however, that have survived the transition from paganism to Christianity are very few.

We have many traditions speaking of warlike expeditions undertaken by Aleutian chiefs to the coast of the American continent, where they founded new communities, but in no instance do we hear of any communications with the west or the coast of Asia.

One of the traditions of the Aleutian people relating to the origin of sea otters is of interest chiefly because it furnishes the only key to the curious superstitions of sea-otter hunters, who, when about to put to sea in search of their quarry, avoid most carefully all contact with women, or the use of any garments or implements that have been used or handled by women. The love of a chief's son for his sister resulted tragically in the drowning of both in the sea. They rose to the surface again, having been transformed into sea otters; but, in remembrance of their progenitors' fate, these animals are said to hold in abhorrence anything that reminds them of the relations between man and woman.

The most careful observer of the Aleutian people was the Russian priest Veniaminof, who resided on the Aleutian Islands and at Sitka between the years 1824 and 1838, and who wrote copiously and understandingly of their manners, customs, and traditions. I can not do better than insert here a few extracts from his writings, in translation:

THE ALEUTIAN PEOPLE.

Under the head of "Traditions" the Russian missionary writes:

1. The Aleuts say that in olden times the weather was clearer and warmer, the winds more moderate. This last assertion is confirmed by the first Russian explorers.

2. They say that their forefathers came from their original dwelling places in the west, in the same great land, which was called also "Aliakhskha," that is, continent. In that country there were no storms, no winters, but constant pleasant atmosphere, and the people lived peaceably and quietly; but in the course of time quarrels and intertribal wars compelled them to move farther and farther to the eastward, until they finally reached the seacoast. Later they were even compelled to take to the water. But even on the coast they could not remain in peace, being pressed by other people, and therefore were compelled to seek refuge on the islands; and finally, traveling from island to island, they settled in their present villages.

3. Before the war and dissension broke out among them here they were accustomed to travel (*agoulaghan*) peaceably to the westward and eastward, to make the acquaintance of other people and their customs; and one of these travelers (*agoulanam*) succeeded in reaching the northernmost cape of America, which he named Kigaditigan Kamga, that is Northern Head, and of which he told his people on his return that it was covered with ice, and told of the products of the country and the habitations of the people, who were as much afraid of heat as we are of polar cold, and at the time of the summer solstice they left their villages, fearing to die if they remained. Subsequently the object and direction of these voyages were gradually changed; in place of inquiries into the customs of other people, they began to travel for the sake of trade and traffic, and finally for purposes of plunder and slaughter, and to go to war.

4. The Aleuts consider as their relatives the Kenaitze, Chugach, Yakutats, and Kolosh (but the Kolosh do not acknowledge this). In substantiation of their claim the Aleuts say that one prominent individual, the father of a numerous family, was from necessity compelled to leave his village on Oonalashka; in one summer he collected all his family and relatives, and departed in large bidarkas to the northern side of the Aliakhskha, with the intention to travel (agoulaghan) and to search for a better and richer country. He landed in the first one of the Aglemute villages and remained, but the Aglemutes did not receive them as friends, but as enemies, and in a general attack put them to flight. The Aleuts, finding it inconvenient or impossible to settle near the seacoast, proceeded to the headwaters of some large river, and having selected a convenient spot settled down for good. Their descendants made peace with the natives of the country and increased, but with their increase came a greater change in their former customs, appearing principally in the greater inclination to war and to hunt. After the lapse of much time a quarrel ensued between the descendants of the original Oonalashkans and the creoles or half-breeds, finally resulting in a war. Their village was situated on both sides of the stream, one half opposite the other. They had adopted the habit, for the sake of accustoming themselves to war, of making sham attacks one upon the other, shooting spears and arrows without points; but during one of these sham attacks some one placed a head upon his arrow and hit an enemy in the eye. The attack was at once changed from sham to reality, but as the number of creoles was much larger the Oonalaskans were obliged to leave the place and move farther eastward, finally passing from river to river and emerging upon the shores of the Gulf of Kenai, where they settled down once more. The present Kenaitze are their descendants. The creoles left behind increased more and more, and divisions of them were compelled to move to the northeastward, and finally became the founders of the Chugachs, Yakutats, and Kolosh.

5. The Aleuts say that in former times their ancestors constructed deep caves as a protection against sudden attacks of the enemy, and in doing so occasionally found the bones of a larger race of people, whom they called Shougaman or Itangikh-Taiyagoun—that is, the first men, or those who, in their opinion, lived before the flood. These bones and skeletons were mostly found in the third layer of earth, and were rarely found to be fossilized; and whenever such a bone was unearthed a very strong, disagreeable odor spread around, driving away all bystanders. They believed that some time ago there was a large flood, and that up to that time men were of larger size, but their philosophers asserted that half-dead people live everywhere under the surface of the earth.

6. They say that in their old country (they do not know of any other) there was also a very great flood in punishment of disregard of sacred customs and traditions. They express it in their language for "our evil doings the water came upon us."

7. In former times the seashore along the whole group of islands was more deeply indented (in some localities this is even yet perceptible); they also say that the grandfathers of the present Aleuts in their youth heard from their grandfathers that they found on elevated spots, and often far distant from the sea, signs of former dwellings, such as whale ribs and large logs of driftwood. Between these places and the shore-line they also found sometimes small pebbles tied with whalebone fiber, such as are now used for sinkers, fish lines, and nets. From these indications the Aleuts came to the conclusion that at some time these elevated positions, showing the remains of dwelling places, were on the seashore, and over the places where the sinkers are now found the sea once extended. But all this was subsequent to the flood.

8. With regard to the volcanoes, the Aleuts maintain in their traditions that in times gone by all the "fire mountains" on Oonalashka and Oumnak islands quarreled among themselves as to which had the largest body of fire inside of them, and after a prolonged dispute, in which not one of them would yield to the others, they concluded that a decision could only be made by a trial of strength. Immediately a most fearful conflict ensued, lasting for many days, the mountains throwing fire and rocks at each other in place of spears; the smaller peaks could not

withstand the larger ones, and, recognizing their weakness, they bowed down and went out forever. Finally only two of their craters remained, one on Oonalashka—Makushin (Ayak)—and the other on Oumnak, the Recheshnaia (Ismak). These, having vanquished all the others, engaged in a single-handed conflict with the most disastrous consequences to their surroundings; fire, rock, and ashes were thrown in such quantities that all animals inhabiting the neighborhood perished and the air became heavy. Oumnak crater finally could not keep up with its rival, and, seeing destruction impending, gathered all its strength, jumped up with a bound and collapsed. The Makushin volcano, being victor and but little injured, and seeing no more enemies around him, gradually calmed down, and now only smokes occasionally.

With regard to early estimates of the Aleut population upon the islands I can not do better than again quote Veniaminof, who wrote as follows in 1840:

The number of native inhabitants of the islands of the Aliaska district, exclusive of Russians and creoles, has been of late very small. In 1834 all the Aleuts belonging to the district, that is, those living in the villages on Oonalashka and on the Pribylof Islands, numbered 682 males and 812 females—a total of 1,494 souls. In 1806 the number had been 1,953—965 males and 988 females. Mr. Sarychef, in his voyage, writes that with the arrival of the Russians on these islands the number of native inhabitants decreased greatly, and during his presence in 1792 barely one-third of the inhabitants remained. A consultation of his tables, however, shows that then the males alone numbered 1,235; if we add to this the larger number of females, the inhabitants of Aliaska District in 1792, exclusive of those living on the Pribylof Islands, were more than 2,500 souls. If, again, we take this number for one-third, as Sarychef says, the number of inhabitants in 1750, or about the time of the arrival of the Russians, must have been not less than 8,000.

The traditions of the Aleuts are to the effect that up to the arrival of the Russians their number was ten times greater than Sarychef found it. Old men relate that a long time ago, before the arrival of the Russians, the inhabitants of Oonalashka district were so numerous that every island and every convenient location was settled, and that in every village were from 40 to 70 bidarkas, with as many adult males able to propel a bidarka; and if we add to these as many females, and twice as many children and old men, it follows that every village contained from 150 to 280 souls, or an average of 215. From personal observation and from tales of the Aleuts I must suppose that in this district 120 villages were located, and thus supposing that each village contained a nearly equal population, it seems that the inhabitants of the Aleutian Islands in their best times numbered 25,000. Doubtless this number is somewhat large, but as far as we can trust to the accounts of the Aleuts, as well as of Russians who lived here at the end of the last century, and who saw with their own eyes the destruction of many villages, it seems very probable that the number of the Aleuts once reached twelve or fifteen thousand. Of the reasons of decrease we shall speak below, and only remark here that the decrease of the Aleuts in numbers began long before the arrival of the Russians, and continued steadily down to the year 1822. From that period to 1829 the decrease ceased; and from 1829 to 1838, until the appearance of the smallpox, the number of Aleuts began to increase. The smallest number of Aleuts we find in 1820 and 1821. In 1822 the registers showed 695 males, 779 females—a total of 1,474. From this it is evident that in 1834 the number of Aleuts had increased by 20 males, without counting the females then married to Russians and creoles, who represented at least an equal number. Glancing at the appended tables of births and deaths from 1822 to 1837 we see that during the first five years the number of Aleuts born average 34 per annum, and exclusive of illegitimate births, 29. During the last nine years, however, the average was 40; exclusive of the illegitimate, 38. Consequently, of late the number of births has increased nearly fourfold. And here it is also necessary to take into consideration that the number of females who bore children, or were able to bear them, was, up to 1828, very much larger than after that period. This is evident from the fact that of 172 souls born from 1822 to 1828, 25 were illegitimate, that is one-seventh of all the births; but in the last nine years only 17 out of 362 births were illegitimate—less than 1 in 21. The reasons why births were formerly less frequent than of late may be briefly stated as follows:

First. The absence of midwives and ignorance of managing women in childbirth. It is true that though a few who are more intimately acquainted with the Russians have adopted their customs before and after the birth of children, being convinced by example and persuasion, but at the present time there are still very many who proceed in their old way.

Second. The married women are still very dissolute, and their excesses interfere with their fruitfulness, but of late there has been great improvement observed in this respect.

Third. In former times the Aleuts were entirely at the mercy of vicious and ignorant hunters. It was quite common to force young girls into marriage with the strangers at too early an age. Of late, however, the teaching of Christian doctrines has counteracted this evil.

Fourth. The diseases of various kinds introduced by the Russians have also interfered with the fruitfulness of women, but this cause has now been nearly overcome.

Fifth. Another obstacle to more rapid increase of population will probably be found in the fact that the Aleuts suffer from temporary starvation every spring, the fathers and mothers on such occasions thinking only of their children, and forgetting themselves to such an extent that in some families the parents can scarcely be recognized as their former selves, while the children are fat and healthy.

These are the reasons why births were of comparatively rare occurrence among the women in former times (in no greater proportion than 1 to 9), and why they are now more frequent. It is necessary to remark that in their present mode of life the Aleut women can not at all compare in fruitfulness with Russian women, because, having no

milk beside their own, they must nurse their children not less than a year. It has been mentioned above that in the course of ten years the number of Aleuts increased only by 10 from a total of 1,474—that is, one-fourteenth of 1 per cent; but the increase of creoles in ten years was very much greater, showing 31 births among 120 married couples, or about 26 per cent. The reasons why the wives of creoles, who were nearly all Aleuts, are much more fruitful than the wives of Aleuts may be the following: The wives of creoles at the time of birth proceed not according to the Aleut, but according to the Russian custom. All creoles are generally possessed of means to procure flour and tea, and keep on hand a sufficiency of provisions at all times. All creoles are also much better lodged than the Aleuts, at least in so far as they have warmer huts and more clothing and linen than the Aleuts, who are not in a condition to procure them. The causes of decrease in population are, in the opinion of Aleuts themselves, internal wars, the Russians, and diseases; the first, occurring previous to the arrival of the Russians, were conducted with such cruelty that in retaliation for the murder of one, whole settlements were destroyed; but the greatest decimation of the Aleut population they ascribe to the Russians, and especially to Sollovey, or Solovief, who was the direct or indirect cause of it, as, exclusive of those whom he and his companions killed during the course of two years, not one-third of those who fled before him returned to their habitations. It is supposed that a majority of those who did not return died from cold and hunger, while the younger and healthier Aleuts found means of subsistence and would not return, and these are the first fugitives mentioned here. In addition, it is said that even when the slaughter ceased, and the Aleuts, becoming accustomed to the later arrivals of Russians, began to live peaceably once more, the population not only failed to increase, but decreased very perceptibly for some reason unknown to them. The causes of decrease among the Aleuts of this district may be divided into three periods: First, from the beginning of their internal wars to the first appearance of Russians among them—that is, up to 1760; second, from the first arrival of the Russians on these islands to the arrival of the expedition of Billings—that is, up to 1790; and, third, from the time of the departure of this expedition until the present time. Each period, in addition to those causes common to all times, has its own proper causes entirely distinct from each other—that is, prior to the arrival of the Russians the Aleuts decreased from internal wars; after the arrival of the Russians, from violence and oppression, but subsequently from being compelled to fit out hunting parties and recruit their columns.

Each period presents a multitude of more or less important incidents, but I shall speak only of such as are best known and entitled to credence.

The first period.—A long time before the arrival of the Russians the Aleuts began to have wars with neighboring tribes—with the Aglemute, and principally with the Kadiaks. Thus it is told that the inhabitants of this district destroyed an Aglemute village on the Nushegak River, at the site of the present rédoute of Alexandrovsk. This victory was so overwhelming that not one of the Aglemute escaped, and a lake near the village was filled with blood and corpses. Several times they attacked the Kadiaks and destroyed their villages. However, though these enterprises were bold and frequently successful, it was but natural that sometimes the Aleuts should meet with disaster. It occurred several times that out of the whole contingent of islanders departing upon such expeditions not one returned, or only a few. Mr. Davidof relates that many Oonalashka Aleuts perished in Ooiak Bay on Kadiak Island, whither they had proceeded for the purpose of attacking the Kadiaks. Retaliation was the order of the day, and both sides suffered severely. Gradually these wars or warlike raids became of such frequent occurrence that the inhabitants of the Shumagin Islands were compelled either to join the hostiles or to retreat to their fastnesses on inaccessible cliffs or outlying rocks. Locked up in their fortifications, not daring to leave them, they could not secure their winter's supplies and died of starvation. In addition to such wars and mutual attacks of different tribes there was also much internal conflict. It is known that the people of Oonimak attacked those of the Shumagin Islands, Aliaska Peninsula, Oonalashka, and even Oumnak and the Krenitzin Islands. The Oumnak people made raids upon the Oonalashkans and others. In the course of time the raiders were raided in their turn, and general destruction, amounting almost to extermination, ensued. It is known that of an attacking party of Oonimak people on the island of Amaknak, in Captains Harbor, all remained on the field of action. Finally the internal dissensions increased to such an extent that not only the inhabitants of one island fell upon those of another, but the people of one and the same island made war upon each other, and inflicted upon each other every imaginable injury. Thus the Aleuts of Oonalga killed several men from a neighboring village on Oonalashka simply because they had threatened to kill one of them. There is no doubt that all these wars caused the destruction of a large number of Aleuts in addition to those slain in conflict. For instance, of the wives and children of the Aleuts who perished at Ooiak Bay, on Kadiak, many who lost husbands and fathers suffered want, and the tradition that the Aleut population previous to the internal wars was twice what the Russians found it becomes probable. A few old Aleuts maintain that if the Russians had not made their appearance upon these islands the population would have entirely disappeared by this time. From this standpoint the arrival of the Russians, which had put an end to the internal war and strife, may be considered as a blessing to the hunters.

The second period.—When the Russians arrived the internal strife was discontinued, and one particular cause of decrease in numbers was removed, but the rate of decrease remained the same. The peace and good understanding established between the Russians who first visited Oumnak and Oonalashka islands under the leadership of Glottof, lasted but a short time. It is not definitely known who gave the first provocation to quarrel—the Russians, by oppression and violence of every kind, or the Aleuts, by refusing to submit to the foreign yoke. The first is much more probable, but the last must not be entirely overlooked. Whatever the cause was, the first hostile measures were taken by the islanders, who during one winter destroyed three Russian ships and thereby gave the Russians a pretext for avenging the blood of their countrymen and for adopting stringent measures for their own protection. It devolved

upon Glottof and Solovief to wreak unlimited vengeance. Glottof having returned from Kadiak to the island of Oumnak, previously discovered by him, found the friendship and good feeling formerly existing between him and the Oumnak people changed to hostility. In retaliation murder and fire took the place of peace and good understanding. Under the pretext of avenging the death of his countrymen, and partially from fear, he destroyed all the villages on the southern side of Oumnak and the inhabitants of the islands Samalgi and Four Mountains. Solovief, who had arrived on Oonalashka from Kamchatka, and anchored his ship in Koshigin Bay, treated the poor Aleuts with excessive cruelty, also under the pretext of avenging the death of Drushinin, another trader. Mr. Berg, in his history of the discovery of the Aleutian Islands, endeavors to underestimate the number of islanders slain by Solovief, but for all that he says that Solovief killed 100 men who had attacked the Russian station, and from one fortified village destroyed by fire 200 bodies were thrown into the water. Consequently, it appears from the testimony of this prejudiced witness that Solovief destroyed not less than 300 able-bodied males and youths. Nearly a century has elapsed since these dreadful times, and there is no longer any reason for concealing the deeds of the first Russian promyshleniks, nor to exaggerate their cruel treatment of the Aleuts. The facts can not be changed or mended, and, though there is no necessity for parading the dreadful cruelties of ignorant and vicious people, especially as these men were Russians and my countrymen, I am compelled to speak of what I heard from very many who had been eye witnesses, or heard the same from Solovief's own companions (I have personally interviewed many Aleuts who had known Solovief); this must be done in order to bring forward new evidence of what men will do when left to themselves with unlimited power and no fear of retribution. Without this my account of these people would be incomplete.

The Aleuts say that the Russians shot many of their number with their muskets only for sport, using them as targets, but others deny this; but it certainly occurred more than once, at least in this district, and particularly in the village of Koshigin. It was Solovief who conceived the idea of ascertaining how many human bodies a bullet would pierce, and to this end he ordered twelve Aleuts to be tied together (who were probably not altogether guiltless), and shot at them with his rifle. It is said that the bullet lodged in the ninth man. It is also known that he destroyed two bidarkas of Oumnak Aleuts who had come to visit their kin, and after many single wanton murders he finally found the inhabitants of several Oonalashka villages assembled on Egg Island, Sprikin, and fortified. The second attack of Solovief was successful, and he destroyed all the besieged Aleuts, with their wives and children. This slaughter was so general that the sea in the neighborhood was covered with blood from the dead and wounded thrown into it.

Natrúbin, partner and worthy companion of Solovief, destroyed the Aleuts on Avatanok, unarmed and frequently innocent, and it is said that Solovief himself did not kill as many Aleuts as his companions on the neighboring islands. During this time, so terrible to the Aleuts, there were two Russian ships in the vicinity, one at Issanakh Strait and the other at Makushin, the crews of which also destroyed many Aleuts. The Russians on the first vessel, from suspicion or in revenge of the Russians killed at Issanakh, destroyed the four villages on Oonimak Island, sparing only the young females and a few youths. The Russians, under the leadership of their "peredovchik," who had with him a girl from Atkha, left a few men on the ship and proceeded to Oonimak, with the intention of exterminating the rebellious people. Secretly making their way to the first village they secured all the spears from the bidarkas, where they are always kept by the Aleuts, and broke them; then suddenly falling upon the defenseless inhabitants in their dwellings, they slaughtered without mercy all who succeeded in emerging from the houses, while the remainder perished in the flames. In the same manner three villages were destroyed. On approaching the fourth, however, situated at the foot of Shishaldin Mountain, they were overtaken by a severe rain storm, and thoroughly drenched and disheartened. The inhabitants sighted them from afar and recognized them as Russians. The chief proposed to meet them outside of the village and kill them, saying that they did not come to them for nothing, but the other prominent inhabitants refused to agree, saying: "Why should we kill them when they have as yet done us no harm?" Consequently the islanders received the Russians kindly, warming them and providing them with food. The Russians were exhausted to such a degree that they could not descend into the subterranean huts without assistance. The poor Aleuts did not know what they were doing. The Russians, having recovered their strength, at once went to work. Having assembled all the natives under some pretext, they began to shoot them down without mercy. They then proceeded on their way to continue the work of death, but the inhabitants of the next village disputed their entrance into the village, and, making a sudden sortie, killed the peredovchik and his girl, wounded a few, and put the remainder to flight. The place was subsequently called "a dangerous village" by the Russians. It is not quite clear to which ship these Russians belonged—to that of Protosof or to that of Bechevin. It is also related that some Russians destroyed three villages on Ikatak Island, and that they fired upon and killed a number of Aleuts who were coming to make them presents of fish.

The second ship at anchor in the bay of Makushin appears to have been the same mentioned by Berg as being under command of Brigin. The Aleuts of one of the villages in the neighborhood, being informed of the destruction of Drushinin's ship in Captain Harbor, made up their minds to imitate the example of another village; the Russians, however, being warned of their danger, turned the tables and annihilated the plotters.

Horrible as the deeds of these first Russian visitors were, some excuse may be found for them, and in some instances retaliation was absolutely necessary. The doings of later arrivals, however, can not be excused upon any ground. The promyshleniks coming to the islands between 1770 and 1790 followed the example of their predecessors, and indulged in the most revolting cruelties. The names of Ocheredin and Polutovsky became especially obnoxious at this period. Of their followers, many are still held in dreadful remembrance by the Aleuts; among them are Lazáref, Molatile, Peter Katyshevtzof, Shabaief, Kukanof, Sitnikof, Brukhanof, and Malkof. The first two of these

were on Akoon Island, and the others farther to the eastward. These men placed not the slightest value upon the life of an Aleut. It is well known and authenticated that the first threw over precipices, cut with knives—which he always carried with him—and felled with axes a number of Aleuts for no other reason than that they dared to look at his concubine (who died only in 1838). One of those men let out the entrails of an Aleut girl because she had eaten a favorite piece of whale meat which he had set aside for himself. When we consider all these murders—I do not speak of such cases as are not fully substantiated—and take into consideration the consequences, it would seem that the number of Aleuts slain by Solovief, according to Davidof, is not exaggerated; he places it at 3,000, and even the number of 5,000 mentioned by Sarychef as that of Aleuts murdered by the Russians, is not without probability. Sarychef calls it a moderate estimate.

At last, in 1790, the arrival of the Billings expedition put an end to murder and cruelties, and a more peaceable life began.

Third period.—Though cruelties and murder ceased after the departure of the Billings expedition, the decrease in the Aleut population did not cease. Misfortunes of another kind, brought about by dangerous pursuits and voyages, formed a new reason for the decrease of the islanders. Thus at one time Merkulief, an agent at Oonalashka, sent 80 families to the Pribylof Islands, of whom less than one-half returned; 32 of these were lost at one time in 1812, in a bidar commanded by Zakharof, and never heard from. A number of others were killed at various times by sea lions.

The occupation of Sitka by Baranof made it necessary to push forward reenforcements of men, and a hundred men with their families were dispatched to Sitka in their bidarkas, but only one-third of them ever returned. The rapid decrease in the number of sea otters made a more active pursuit of the animal necessary, involving long voyages from one hunting ground to the other. During such journeys many perished; in 1809 a bidarka with 40 people, in crossing from Oumnak Island to the coast of the peninsula; in 1811 a bidarka with 30 men; in 1824, 20 bidarkas which left the Four Mountain Islands were lost; and, finally, in 1828, a bidar with 15 men in the Akutan Straits. In addition to these disasters there were, of course, numbers of less importance. It is impossible to ascertain the whole number of lives lost in this way; it is certain that the number greatly exceeded that of deaths from natural causes. In addition to the causes of decrease already mentioned, there were others that may be called unavoidable and unforeseen causes, such as famine and infectious diseases, both of which were very prominent factors in decreasing the population. Famine made its appearance at the time of the internal wars, according to the traditions of the Aleuts, and it seems that its victims were more numerous than those of battle. Ever since that time famine has been a constant visitor among the Aleuts, before and after the arrival of the Russians, and even after the establishment of the present privileged company. The Aleuts never lay up great stores of provisions, and nearly every year they suffer at least a partial famine during the first months of the year. Their name for the month of March is Khissagounak—that is, "when straps are chewed." This expresses that about that time they had no proper food. It is evident, therefore, that at such a time the least misfortune in hunting may bring about the most dreadful consequences. But what must be the condition in those villages where only women and children remain—the men having perished, or gone away by order of the company? This was often the case in former times; indeed, numerous instances of wholesale starvation are known. Under the administration of Burénin all the inhabitants of one of the villages on the eastern coast of Akutan died of hunger, only one old woman remaining to tell the tale. Also, under Petroff's administration, in 1822, seven people died in Koshigin village of hunger, but, thanks to the efforts of the officers and chiefs, such disasters are likely in the future to be prevented, though scarcity of food may still be apprehended.

Of epidemic diseases we have but little information. They have occurred in this district, but the deaths have been less here than in other regions of the colonies. The nature of epidemics in early times is of course unknown, but in 1807 and 1808 there occurred on Oonalashka an epidemic called the "bloody fever," which began in the principal village and rapidly spread over the whole district, a very large number of men and young women dying of the same; old people seeming to have been entirely exempt. The greatest mortality was in the principal village. After the wreck of an American ship, under command of O'Kane, the virulent disease made its appearance, the origin of which was ascribed to the eating of wet rice. This disease began to spread, and attacked large numbers, in every case those who partook of the rice. In 1830, in the autumn, an epidemic began and continued until the spring of the following year; 30 people, mostly youths and strong men, died of this disease, but children, old men, and the whole female sex seemed to have been exempt. The greatest mortality from this cause was at Oonga, where the disease had appeared sometime before, and extended to the Aliaska Peninsula. On the other islands it was unknown. The last epidemic was the smallpox, which appeared here in 1838. The syphilitic disease was perhaps the most disastrous of all, but the extent of its ravages has not been ascertained. This disease appeared with the Russians, and committed its greatest ravages about 1798. At that time there were whole families and even villages, from the oldest to the youngest, marked by this dreadful disease. Such a family came under my own observation in Makushin village, but I believe that this family was the last victim of this plague, as since that time I have observed but rare instances, principally in the harbor village during the presence of ships.

THE AGE AND ORIGIN OF THE ALEUTIAN PEOPLE.

To express a definite or authoritative opinion on the subject would be impossible, because there is no definite information concerning it; opinions must be necessarily based upon guesswork up to traditions of the Aleuts themselves and local indications.

Were these islands always inhabited, and who were the first inhabitants—Aleuts or another people? At the first glance upon the islands of the Oonalashka district, devoid of timber and poor in products of the land, it becomes evident that the present Aleuts must be the first inhabitants; and it would also appear that they did not settle here very long ago. The traditions of the formation of these islands are not very clear, but we encounter at every step the traces of volcanic revolutions of comparatively recent date. Traces of villages have scarcely been touched by time, and whenever the old men point to a spot where a village existed in former times we can still perceive the groundwork of the huts, and even the holes for seasoning the fish, and a luxuriant growth of grasses plainly indicating the extent of the former settlements; therefore we may conclude that the islands have not been inhabited very long, and that the present Aleuts are the first race that settled upon them.

From whence came the Aleuts to these islands—from America or from Asia? The traditions of the Aleuts, chiefly transmitted in song, say the Aleuts came from the West, near the great land, then Aliakskhakh, or Tnam Angouna, which was their original habitation, and that they wandered from there to these islands, and then gradually extended to the eastward and finally penetrated to the present Aliaska Peninsula.

Tnam Angouna is now one of the Four Mountain Islands, and in its present condition certainly does not deserve the name of "great land" when compared with any of the other islands. Perhaps it received its name from being the largest of the Four Mountain Islands; but in spite of this some of the Aleuts believe that they originated there. This theory would only be admissible if we were to assume that the Four Mountain Islands at one time formed one body of land together with the Andreanof Islands, and perhaps was united with Kamchatka. But it is much more probable that the Aleuts really came from the West, from a great land—that is, Asia—and their descendants penetrating farther to the eastward, though preserving the tradition about coming from the great land situated in the West, lost any definite idea of the same, forgetting, perhaps, the very existence of Asia, and began to believe that the small island Tnam Angouna was the place of their origin.

The migration of the Aleuts from the westward may be accepted as a fact; and even if the mainland of Asia and the Aleutian Islands were always at the same distance from each other that they are now, the island of Bering is visible in clear weather from Kamchatka, and from Bering the nearest Aleutian Island can sometimes be sighted[?]. This would indicate the route of the migration; as to the mode of conveyance by which the Aleuts made their way from the continent, it is most probable that they traveled in canoes and bidarkas, since in former times the weather was very much finer during the summer and clearer than it is now. Such journeys from the Kamchatkan shore to the Aleutian Islands were accomplished even after ships had commenced to make the voyage. We might add that if the Aleuts came from Asia they must have come from Kamchatka, or from Japan over the Kurile Islands, and in that case there should be some similarity, in language and customs and mode of life, between the Aleuts and the coast people of Asia. At any rate, the Aleuts bear greater resemblances to the Asiatic than to the Americans; while, on the other hand, the Fox Island Aleuts, in their appearance, mode of life, and customs, resemble more closely the North American native, especially the Kadiaks. Their language, though differing from that of surrounding tribes, is constructed in the same manner as that of the Kadiaks, which is known to all the tribes inhabiting the coast of North America; and even the language of the Chugachs (Chukches?) is a branch of it. There seems to be no similarity between it and the Japanese, as far as I can judge from questioning the Japanese who visited Sitka.

But even this theory could be overturned by the following question: Suppose that the Aleuts and other Americans speaking the Kadiak language had, sometime before the settlement of America, lived in close vicinity, the latter to the southward and nearer to Kamchatka, and the former to the northward and nearer to Chukhotsk; but, in time, being pressed by other tribes, they were compelled to migrate to their present residence, the first from Kamchatka to Bering Island and farther on; the latter probably much earlier crossed Bering Strait to America, and perhaps continuing on their way southward and founding other nations, such as the Kolosh, the Indians, Mexicans, and others. In this case they should not forget the wars carried on, especially between the Aleuts and the Kadiaks. Was not this strife, which existed before the arrival of the Russians, the remnant of wars between them before migration?

We know now that Veniaminof misunderstood the meaning of some of the Aleutian traditions. The Tnam Angounaa, or Four Mountain group, was formerly a center of population among the islands, as can easily be surmised from the large number of ancient village sites and burial caves found here; and from Tnam Angouna other islands were doubtless settled. The name Aliakshakh or Alakshak was always applied to the Aliaska Peninsula.

GOVERNMENT.

Veniaminof wrote as follows on this subject:

Before saying anything of the government of the Aleuts I must refer to their present condition and rights. At the present time all the Aleuts may be said to form a class of laborers, because even their tribal chiefs are only overseers, frequently laboring with their command, and not in any way distinguished from the others. Only of late years the head chiefs appointed by the commander of the colonies, and selected by the Aleuts from their own chiefs, have enjoyed a certain distinction, especially in their intercourse with the office managers.

In former times the Aleuts were divided into three classes—the chiefs, the common people, and kalgi or slaves; the chiefs and their children and relatives and their descendants composed the highest class, prominent in warlike

exploits, and skilled in the chase. The class of common people consisted of ordinary Aleuts, not differing from servants or laborers, but the slaves and their descendants were prisoners of war.

The right of disposing of slaves was only vested in the upper class; the common people rarely had slaves, and no slave had any authority whatever over another. The power of the master over his slave was almost unlimited; he could punish him with death for crime without incurring any responsibility; he could sell him or trade him for goods; he could give him away, or set him at liberty. The price of slaves was nearly always at the rate of a bidarka and a good parkee for a couple of slaves—that is, a man and a woman; and of a stone knife, bunch of beads, or a sea-otter garment for a single slave. The slave could hold no property; everything he acquired belonged to his master. He was always obliged to accompany his master and protect him in cases of attack, and, in consideration of this, the master was obliged to support not only the slave, but his family. A slave suffering want would bring dishonor upon his master. Good and kind masters maintained their slaves, and especially the industrious and faithful among them, like their own children, and the name of slave was the only distinction between them and the children of their master.

The form of government of the Aleuts may be called patriarchal. Every village consisted always of relatives and formed only one family, where the oldest of the tribe was named Toyone (*Toukhoukh*), and had power over all, but his power was very much that of a father over a large family—that is, he was obliged to look after the common welfare, and to protect his territory (every village had its grounds set apart); strangers were not allowed to hunt in grounds thus set aside; infraction of this rule often gave rise to wars. That chief was the leader in war, but he had no right to take from his command anything except the share due to his family of all food, furs, or driftwood, whether he was present at the distribution or not; but his share was not greater than that of any other man. With regard to the affairs of the community his power extended far enough to enable him to send out anybody with sons or relatives to execute any errand that might benefit the community, but on his own business he could not dispatch anybody. No special honor or outward respect was shown to the chief. The Aleuts had punishments, and even capital punishment, but the latter could not be inflicted by the chief without the consent of all the nobles. The chief could not begin wars with neighbors without the consent of other chiefs living on the same island, and without the consent of the oldest among them.

A few villages, the inhabitants of which had sprung from one family, formed a state or community, where the oldest chief descended in a straight line from their forefathers, who first settled the islands, was the ruler. If no direct descendant was available, the head chief was selected among the other chiefs for his bravery, wisdom, and skill in hunting. He had such powers over the other chiefs as were vested in the chief of the village over his own people. It was his duty to protect all and avenge insults; in case of war he commanded, all the force with the consent of other chiefs, and made peace in the same way. Without his consent no subchief could make war upon his neighbors, or undertake a raid against the Kadiaks, or set out upon any important hunting expedition. Of all that was cast up by the sea he had an equal share with the people of each settlement, and therefore such head chiefs became richer, and consequently stronger, than the others. The respect in which the head chief was held by the neighboring tribes depended entirely upon the influence which he wielded over his own subordinates. The principal chief, with such powers and rights, may be called the ruler of his island or district, but the Aleuts never had any chief or ruler who had the right to dispose arbitrarily of the whole community.

I have already remarked that the Aleuts have capital punishment. The murderer and the betrayer of community secrets were punished with death. When it had been reported that an Aleut had committed a crime worthy of death, the chief assembled the council, composed of all the nobles and old men and himself; he laid the matter before them and asked their opinion, and when all were unanimous in judging the accused as worthy of death, all the males seated themselves in an open space, armed with their spears. The culprit was also brought out, surrounded by a few young men at the command of the chief, and suddenly, at a preconcerted signal, they thrust their spears into him. If after this he was still alive one of the warriors was ordered to stab or cut him to death. It must be remarked that it was not necessary to keep the culprit guarded or to bind him during the punishment, because every criminal endeavored to make the greatest display of indifference in the face of death. He never wasted words in exoneration or in appeals for mercy; he walked upright and fearlessly to the place of execution in order to make his name famous among his people. Many of such executed criminals are still praised in the songs transmitted to their descendants.

Other less important crimes were punished at first by reprimand by the chief before the community, and upon repetition the offender was bound and kept in such a condition for some time. This was a great disgrace; in rare instances the men thus tied were beaten. The law with regard to slaves was more strict and better defined. For disobedience the ears were cut off; for insolence to the master, lips were severed; and if any evil resulted from indiscretion on the part of slaves, such as war or quarrels, the offender was put to death. For the first attempt to escape they received corporal punishment; for the second, their hands were tied at their backs, and in such condition they were kept a long time; for the third attempt they were hamstrung; and for the fourth attempt the punishment was always death. The mode of puting slaves to death was entirely different from ordinary executions. They were not speared, as other people, but killed with clubs. For the first theft (which was considered a very disgraceful crime, especially when the slave stole from strangers), corporal punishment was inflicted; for the second offense of the kind some fingers of the right hand were cut off; for the third, the left hand and sometimes the lips were amputated; and for the fourth offense the punishment was death.

The power of the chiefs and all the rights of the Aleuts were in full force at the time when the population was

greatest. Interior wars decreased the number of Aleuts, and at the same time the power of the chiefs and their own privileges, but with the arrival of the Russians the latter were entirely extinguished, and even the power of the chiefs remained only a shadow. Solovief and his companions, whc undertook the work of pacifying, or rather exterminating, the Aleuts, first lessened the influence of the chiefs over their people. The Russians who followed in their wake also adopted this policy, until the chiefs were distinguished in no way from other Aleuts, being exempt neither from labor nor from punishment. In course of time the Aleuts began to look upon the chiefs as their equals in every other respect. Our Government empowered the commanders of naval expeditions that visited this region between 1792 and 1823 to confer bronze, silver, and gold medals upon the chiefs, and the new regulations of the Russian-American Company provided for the distinction of chiefs from common people, restoring to them a portion of their former power. It is difficult, however, to restore or establish what has no stability in itself. Of late years (1832) the colonial government found it necessary to set up in this region two or three head chiefs selected by the Aleuts themselves from the number of tribal chiefs and confirmed by the chief manager of the colonies. And thus the present government and management of the Aleuts depend altogether upon the Russian-American Company, acting through the manager of the Oonalashka district, who, on the strength of his office, gives directions and orders to the "bidarshiks" for transmitting the same to the Aleuts through their chiefs; or the manager consults with the head chief and a few others, and explains to them his orders concerning hunting, and similar subjects, asking them how many bidarkas they can furnish for the sea-otter parties, and how many men for shooting birds, etc. The present rights and duties of the Aleuts are as follows: They enjoy the protection of the law equally with the serfs, but they are exempt from all duties and taxes. As an offset to this, they are obliged to serve the company from the 15th to the 50th year of their age, receiving pay from the company for their services. All furs which they may obtain must be sold exclusively to the company at certain prices established by the Government.

It may be asked, Is the present government of the Aleuts and their present condition good? I answer, it is good; because the Aleuts, aside from their service with the company, enjoy complete liberty, and their service is only temporary and always for pay. The company takes good care that the man appointed as the manager of the Oonalashkan district be a man of good intentions and executes strictly the directions of the colonial government. The Aleuts have not recovered their former liberty, but there is no necessity for changing their present condition for any other. Any change could only be injurious, and even disastrous. It would be perhaps desirable that the Aleuts should receive for their furs prices somewhat commensurate with those charged for goods, and also that their head chiefs should have the right to look at the accounts of the Aleuts kept at the various offices, and that all the chiefs be furnished with written rules and instructions for their guidance. Such changes as these might prove beneficial to the various communities.

RELIGION AND BELIEFS.

The religious belief of the early Aleuts was an outgrowth of shamanism as found in the Asiatic possesions of Russia. The Aleuts believed and acknowledged that there is and must be a creator of everything visible and invisible, and who was called by them Agoughoukh—that is, creator—but having only a limited understanding they did not connect him with the management of the world and showed him no particular respect. Worshiping no one being, they soon came to worship everything that seemed of importance to them. As rulers of everything in their surroundings they have acknowledged two spirits, or two kinds of spirits, who regulated the fate of man in every respect. The first they called Khougakh and the second Aglikhaiakh. Some of these worked blessings to man and others only evil, but how far their influence extended and the limits of their power even their best theologians could not define.

Among the earliest Aleuts there may have been worship of the light and of celestial bodies. The first may be surmised from their custom of saluting the light.[1] The second supposition is based upon the fact that they were always afraid, and still show reluctance to say anything bad of the celestial bodies. The old men told the youths that anybody speaking ill of the sun—for instance, complaining of its heat or glare—would be struck blind and never see its light again. The moon was supposed to kill its slanderers with stones, and whoever censured the stars would be compelled to count them or else lose his life. If, in the summer time, upon a clear and calm day, some youth would complain to his companion of the heat and regret the winter, with all its storms and famine, such carelessness was always punished by the sudden appearance of violent gales and storms, and if the offense was repeated the winter would always make its appearance earlier and with greater severity than common. In this way the young Aleuts learned to display the greatest indifference to all changes of weather and temperature.

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[1] This early custom is described as follows:

The grown men were in the habit of emerging from their huts as soon as day was breaking, naked, and standing with their face to the east, or wherever the dawn appeared, and, having rinsed their mouths with water, saluted the light and the wind. After this ceremony they would proceed to the rivulet supplying them with drinking water, strike the water several times with the palm of their hands, saying, "I am not asleep; I am alive; I greet with you the life-giving light, and I will always live with thee." While saying this they also had their faces turned to the east, lifting the right arm so as to throw the water, dripping from it, over their bodies. Then, throwing water over the head and washing face and hands, they waded into the stream up to their knees and awaited the first appearance of the sun. Then they would carry water to their homes for use during the day. In localities where there was no stream the ceremony was performed on the sea beach in the same manner, with the exception that they carried no water away with them.

The Aleuts believed that there were three worlds, each with its separate beings and doings. The first world, which was called Akaean Kughoudakh; that is, the highest world, where there was no night or evening, and where a multitude of people live forever. The second world was our globe. The third was subterraneous, and called Sitkoughikh Kouyudakh, where there was also a multitude of people, whether mortal or immortal was and is not known. They had no temples, but there were sacred or hallowed localities called Aoudeagadakh, and also sacrifices to invisible spirits. The first could be found in every village, being generally some rock or cliff or other prominent place. The females and young men were strictly prohibited from visiting such places, and especially from gathering the grasses and weeds growing upon them. Any infraction of this prohibition on the part of bold or curious youngsters was sure to be followed by disease and speedy death. In a few instances insanity was the consequence. The adult males could visit these spots at certain times, and only for the purpose of sacrificing.

The offerings (*ákhakhilik*, that is, "All his to him he gave") were of two kinds, one optional and the other defined. The first sacrifice consisted of almost any object, principally the skins of animals, which were brought to the sacred spots with trifling ceremony and prayers for assistance in war or the chase. The second sacrifice consisted of the tail feathers of cormorants and a few other birds only worn by men. These sacred places were protected only by prohibition. The modus operandi consisted of the votary's taking a certain number of feathers, smearing each of them with some paint, generally green or red, and throwing them to the four winds and uttering his request to the invisible spirits every time that the feathers escaped from his fingers. When the sacrifice was completed the man simply said, "Now give me what I ask."

The early Aleuts had shamans and shamanism, but what their sorcery consisted of is now difficult to ascertain beyond the fact that it was accompanied with the usual accessories of songs, dances, beating of drums, and contortions. The shamans here as elsewhere called themselves mediators between the visible and invisible world—between men and spirits; and the mass of the people believed that they were acquainted with demons who could foretell the future and aid these sufferers, and therefore turned to them for aid in dangerous sickness or misfortune, asked them good luck in hunting, long life, rescue from danger at sea, the calming of gales, and also those who were not accoucheurs called them into their houses in cases of difficult birth.

Concerning their knowledge of the future the old Aleuts assert that some of the more prominent shamans had foretold, long prior to the arrival of the Russians, that white men with strange customs would come to them from the sea, and that subsequently all the Aleuts would be transformed to resemble the new arrivals and live according to their customs. They also asserted that at the time of the first appearance of the Russians they saw to the eastward of their islands a bright light, or large star, containing many people resembling the newcomers, but in the lower world few people remained, and impenetrable darkness set in.

In spite of all their knowledge and power and their efforts to impose upon the ignorant, the shamans were not held in much respect, being scarcely distinguished from other people. Though helping other people, they frequently were themselves in want of assistance and were forced to apply to others. They perished from hunger and accident, like their fellows. It was a very rare occurrence that the son of a shaman adopted the trade of his father. Probably the shaman on his deathbed forbade his son to do so, explaining to him the worst side of his position, and turning his desires into another direction. Many of the shamans called their occupation "service of the devil," and told the young men that nobody who had any fear or apprehension must lay claim to the title of shaman and that they themselves had not adopted the profession voluntarily, but because they were powerless to resist the devil. The Aleutian shamans said they could not summon spirits (as the Kolosh do), but that the spirits made them their servants. They claimed that from the age of fifteen years the devil begins to trouble them with constant apparitions and delusions. While hunting at sea they would constantly see an island rise before them, or immense cliffs bar their way to the shore; traveling on foot, they would be tempted from their path by other kinds of apparitions in the shape of animals or marvelous beings until they were bewildered and willing to submit to their inevitable masters. It is known that the Aleutian shamans have nothing whatever to do with marriages, births, or the bringing of sacrifices.

The Aleuts had an indefinite belief in the immortality of souls and in a future life. This becomes evident from the fact that prominent individuals on their death directed the killing of slaves to serve them in the other world as they had done here. They could not say what the condition of souls was in the future world, but the slaves considered it a favor and an honor to be sent with their master, and therefore we may conclude that they expected to live pleasantly in the coming life.

They all believed that the souls of the dead, or, as they called them, "shadow," remained invisible among their people, accompanying them on land and sea, especially those whom they had loved, and that they were in a condition to do good as well as evil. Therefore the living called upon the dead in times of danger, especially in wars undertaken for avenging insults to the tribe.

With regard to the origin of the first man the Aleutian theologians are not unanimous. Of all their various theories, either very absurd or grotesque, or very similar to our sacred history, I present here only two. One says that at the beginning the earth was vacant, inhabited by nobody, but at one time there fell from heaven to the earth two beings somewhat resembling man, but they had long fur all over their bodies. From them sprang a couple of similar beings, but without the fur, and from this couple again came all the people, and began to spread out to the east and north (they do not mention the south; they did not suppose the people could live there). The place where these people originated was warm—there was no winter, no gales, but a perpetually pleasant climate. The first human beings were long-lived, strong, and hardy. At the beginning the people lived peaceably and in friendship, knowing no dependence or independence, no quarrel, and no wants; but with the increase of people want and

necessities appeared, and in their train the art of making arms, or hunting animals; then came dissensions and wars, and the arms were turned against men. Want and the oppression of the weaker by the stronger compelled the former to migrate from their original habitations, and thus the world was peopled.

Others say that before any people appeared on Oonalashka or other parts of America there was on the island of Unaska one man (his name is not known), who, having lived for a long time in utter solitude, began to think that perhaps somewhere in the world there might be other people like him, and therefore, with the intention of searching for his fellows, he concluded to travel. He constructed a boat—a kind of bidarka—called oulilíak. At first he circumnavigated Unaska, and, finding nobody there, he went on to the island of Four Mountains; there also he found nobody. Finally he proceeded to Oumnak, and, landing upon its western extremity, went ashore and at once saw a human track. A short time elapsed and a woman walked up from the beach in grass boots. He was not long in making her acquaintance, and as she suited his taste he made her his wife. From this couple sprang all the people inhabiting the northwestern part of America. The first fruit of this union was a dog; the second, a very strange being of the male sex with wings, who, when he grew up, began to say to his parents, "I am not like men; you have no share in me." The mother, having heard this remark several times, and seeing that he actually was not like them, nor apt to propagate the human family, and consequently would only work evil, proposed to her husband to kill him, and the father consented. When they had killed him with their own hands a son was born to them, and then a daughter, perfect human beings, and from these last couples people began to multiply. But their children moved away from them, and some spoke different languages. The difference of speech induced them to scatter all the more in all directions; those speaking one language settling together, and those migrating to the eastward founded the various nations of the mainland of America.

The superstitions of the Aleuts were innumerable. Every action or undertaking or every step required its own observances and talismans. Of the latter the most common was a girdle plaited of sinews and grasses under invocations; and certain pebbles, called by them "chimkikh," cast out by the sea occasionally. (This pebble resembles in shape a turnip, but is hollow inside, smooth on the outside, and of two colors, one entirely white with yellow rings, and another red with white rings. The first were called male and the other female pebbles.) The first talisman was worn on the naked body as an unfailing protection from death during hostile attacks or encounters with animals. Possessed of this charm a man would conquer everybody and everything without injury to himself. In spite of the fact that the material of these girdles was of no value whatever, they were by no means plentiful, and passed as heirlooms in families from father to son, or from uncle to nephew, with certain ceremonies. The second talisman was exceedingly rare, and, therefore, very highly valued. The fortunate individual that found such a one preserved it in some secret and clean place, and never looked upon it until the house was quiet, and after having washed his hands, and never unless some dreadful danger threatened. This pebble was only taken from its resting place on sea-otter expeditions, when it served as a charm to attract the coveted game. The lucky possessor was always fortunate in the chase; he did not hunt the sea otter; the sea otter gathered around him and gazed at him with loving eyes.

To secure success in fishing they attach charms to the line and hook, consisting of small fragments of roots, weeds, or anything green or colored.

The pursuit of whales was encumbered with many observances and superstitions. The spearheads used in hunting the whale were greased with human fat, or portions of human bodies were tied to them, obtained from corpses found in burial caves, or portions of a widow's garments, or some poisoned roots or weed.[1] All such objects had their own special properties and influence, and the whalers always kept them in their bidarkas. The hunter who launched a spear provided with such a charm upon a whale at once blew upon his hands, and having sent one spear and struck the whale, he would not throw again, but would proceed at once to his home, separate himself from his people in a specially-constructed hovel, where he remained three days without food or drink, and without touching or looking upon a female. During this time of seclusion he snorted occasionally in imitation of the wounded and dying whale, in order to prevent the whale struck by him from leaving the coast. On the fourth day he emerged from his seclusion and bathed in the sea, shrieking in a hoarse voice and beating the water with his hands. Then, taking with him a companion, he proceeded to the shore where he presumed the whale had lodged, and if the animal was dead he commenced at once to cut out the place where the death wound had been inflicted. If the whale was not dead the hunter once more returned to his home and continued washing himself until the whale died.

For hunting the sea otter such poisoned spears were not used, but as the Aleuts believed that the sea otter was a transformed human being, they endeavored to ornament their bidarkas, their garments, and their spears as much as possible, in the belief that the sea otter would be attracted by the beauty of the outfit.

Of the many superstitions concerning health, long life, etc., I know only of their fathers and uncles endeavoring to obtain the viscid expectorative matter from the throat of some old man famous for his achievements, and of irreproachable character, who had been healthy, and compelling their children or relatives to swallow it as a preventive against all violent and epidemic diseases, and as a general strengthener of the body. Such old men, in

[1] Aleuts assert that some of the corpses found at the present day in caves on one of the Four Mountain islands were in the same condition in their earliest times as they are now. They are lying together, one beside the other, clothed in dog-skin parkees; their beard and hair are reddish, the skin of the body black; and from these corpses the hunters endeavored to detach some pieces of the body, or perhaps a fragment of clothing. The hunters who obtain such charms are always fortunate in their pursuit, but meet with an untimely and painful death. They begin to putrefy while yet in their prime.

dying, frequently blessed their relatives, and gave them some of their gray hairs, or fragments of their clothing, or arms which they had carried in wars, and ordered them to preserve them as charms against misfortune and disease.

The females had their own observances and customs at times of birth, etc., of which I do not know the particulars, and perhaps they are not worth knowing.

It is remarkable that with their talismans, and invocations, and other superstitious ceremonies it is a rule to admit no female and to impart no knowledge of these ceremonies to the other sex, the greatest disaster being threatened in case of infraction of this rule. For instance, a whale hunter who had violated this law would be seized, before the stricken whale had yet expired, with violent nose-bleeding and swelling of the whole body, often ending in insanity or death. The sea-otter hunter was not subject to such terrible punishments, but he met with misfortune in the chase, and, though surrounded by sea otters, could not kill a single one—the animals laughing at him, gathering around his bidarka, and throwing water into his face in sport. The same happens to sea-otter hunters whose wives prove unfaithful during their absence, or whose sister is unchaste. The same strange conduct of the sea otters was sometimes observed toward the lazy, evil-disposed, or disrespectful toward the aged. It is impossible for any belief to exist without some moral lesson contained in it, and we may consider that even the superstitions of the Aleuts led toward cleanliness of body and a careful execution of their duties, no matter how absurd and respectful the demeanor.

I will endeavor to give here briefly the moral code, which I believe is evidently contained or hidden in the mass of superstition among the early Aleuts:

First. The old men said it was necessary to respect parents because they gave us life and nursed us in sickness and brought us up with great trouble, full of kindness, and deprived themselves for our sake without knowing what we would do for them, and, therefore, we should sincerely love them, do all we could toward their support, remain with them, and care for them until their death; if they should become blind or feeble we should take them by the hand and lead them. To disregard one's parents was considered the greatest and most dishonorable of crimes.

Second. If one had no father he should respect his oldest brother and serve him as he would a father, and a brother himself must always aid his brother in war as well as in the chase, and each protect the other; but if anybody, disregarding this natural law, should go to live apart, caring only for himself, such a one should be discarded by his relatives in case of attack by enemies or animals or in time of storms; and such dishonorable conduct would lead to general contempt.

Third. Feeble old men must be respected and attended when they need aid, and the young and strong should give them a share of their booty and help them through all their troubles, endeavoring to obtain in exchange their good advice only; and whoever acts thus will be long-lived, be fortunate in the chase and in war, and will not be neglected when he becomes old himself.

Fourth. The poor must not be neglected, but assisted; not only not abused, but protected against abuse, because man does not always remain in the same condition, and even in the richest and most powerful tribes, as well as in the lowly and poor, sometimes quite unexpectedly their condition changes, and the rich will become poor and the poor rich, and therefore:

Fifth. During poverty they should be humble and respectful, and not offend the rich who divide with the poor.

Sixth. We should be hospitable; every visitor should be received as liberally as possible, and feasted, in order that he, on his return to his people, may speak of us with praise.

Seventh. All who move to another village are called strangers during the first year, and such must not be abused, but aided and assisted in every way, and considered as of the people. Under such they will sooner forget their own homes and become accustomed to the new; and in case of need will be defenders of the village.

Eighth. We must not be forward; it is better to listen than to speak in every condition of life. That is what made people in olden times long-lived and strong, because they talked but little. Every evil and misfortune springs from the tongue; therefore in olden times those who caused common misfortune by imprudent talk were frequently punished with death.

Ninth. The children were instructed to be kind in their intercourse with others; to refrain from selfishness; to be bold in case of hostile attacks, and disdain death, and strive to accomplish some famous deed, such as avenging the death of their relatives, and so forth.

Tenth. The following offenses were considered as worthy of death or punishment: for instance, to abuse a companion without cause by word or deed, or to kill him (but to kill an enemy was quite another thing); to take another's property; to steal or rob (theft was not only a crime but a disgrace); to betray secrets of the councils of war; to grumble at severe weather, cold, wind, or heat of the sun; to talk unnecessarily and unfavorably of stars and clouds; to defile in any manner a sacred spot, or a stream of running water, so as to prevent fish from coming up, or to disturb the sea in the vicinity of the village, and thereby drive away the fish or game. Girls or unmarried females who gave birth to illegitimate children were to be killed for shame, and hidden; their children were called "anikshoum agoucha," that is, "hidden children."[1]

[1] The Aleuts said and still maintain that illegitimate infants killed from shame would begin some time after being buried to cry and weep like new-born babes, and finally they would begin to walk around at night in the villages, appearing like little clouds, weeping also, and when many such children were observed the fathers of families assembled and tried to find out the guilty persons, and if the culprit would not confess they sometimes proceeded to torture. The kindest father would not screen his favorite daughter in such a case; but when the guilty person was discovered she was smeared with paint and placed in a dark and bleak hovel. Here she was seated in a corner and covered with a grass mat with two slits so as to expose the breast, and then she was obliged to sit in

Incest was considered the gravest crime, and was punished with great severity; it was believed always to be followed by the birth of monsters with walrus tusks, beard, and other disfiguration.

The Aleuts still maintain that a failure to observe the customs of their forefathers, and especially a willful neglect of the same, is attended with all kinds of disasters and punishments. They always return good for good and evil for evil. It was considered praiseworthy to go to sea in times of gales and to make difficult landings. As a proof of such achievements they would mark their bodies in some way to indicate that they had been on some inaccessible cliff, or that they landed unassisted with their bidarka at some spot where nobody had yet landed before. But still more praiseworthy it was to be brave in war. The first duty was to be kind to strangers, because their forefathers had been travelers, and they had all sprung from one father and one mother.

The light was the life-giving principle; running water gave strength to the body, but the sea water was still stronger, making men fearless and invincible. Therefore, whoever was in his youth afraid of the sea would be forced to bathe, and thereby made strong and brave.

One of their sayings was, "The wind is no river;" that is, the river runs always and never stops, but the wind sometimes stops. Another saying was, "A bear is not a man;" by which they meant that a bear is not so revengeful and bloodthirsty as a man. Another saying was, "Not out of every sweet root grows a sweet plant;" that is, good children do not always come from good parents.

The teachings of their faith and all customs were transmitted in two ways, either from father to son, or, more frequently, from uncle to nephew. This teaching may be called domestic. Another manner of propagating their doctrines was communal or public, when the teachers were not shamans but old men who had lived to a great age and become famous for their achievements and disinterested life. Such old men considered it their duty to teach the young on every occasion, and this was done nearly every day, in the morning and in the evening—that is, when all were at home. The old man would go to the middle of the barabara for this purpose and seat himself, and all the young people would surround him and listen attentively to all he said; even if he repeated the same advice for the hundredth time they would listen to him with respect, because they considered it their duty to do so.

Now let us speak of their present faith. The Aleuts, as well as the Kadiaks, are baptized Americans—i. e., natives, and are of the Greek-Russian faith which they adopted from Russia. The Aleuts may justly be called exemplary Christians, because they abandoned shamanism as soon as they received Christianity; not only the outward signs of it, such as masks and charms, which they used in their dances and invocations, but even the very songs in which they transmitted the deeds of their ancestors, and their former belief and customs, were all forgotten without any compulsion. The first to convert and baptize them was the Ierodiakon (or holy monk) Makar (a member of the Kadiak mission), who had been sent to the Aleuts from Kadiak in 1795. He did not have recourse to any violent measures in inducing them to be baptized, and if he had been inclined to forcible means he had not the power. The Aleuts received the new belief very willingly. The best proof of this lies in the fact that Father Makar traveled from place to place, to the most distant villages, without having any protector with the exception of one Russian servant. The Aleuts themselves transported him from place to place, fed him, and protected him on his errand of baptism. And from that time to the present the Aleuts have been God-fearing and religiously inclined. They willingly assemble for prayer wherever there is an opportunity for service, and especially when they are visited by a priest. During service of prayer they stand in rapt attention and admiration, without turning to one side or the other, and without shifting from one foot to the other, no matter how long the service. At the end one may look at the prints of their feet and count how many there were; and though they understand but very little of the teachings of the church they never slacken their attention during the service. All religious observances required of them they fulfill to the letter. I need not mention that they strictly observe the fasts, because hunger goes for nothing with them for two or three days at a time. But nothing pleased me so much as the willingness, or rather the ardor, with which they listened to the word of God, their ardor being so great as to fatigue the most earnest teacher. This I can assert from personal experience. During my journeys among them, whenever I arrived at a village, all at once left their avocations, no matter how important to their immediate or future comfort; they collected around me at the first signal, all listening to me with rapt attention, forgetful of everything else; even tender mothers sometimes disregarded their crying children, whom they had left behind in their huts. The strong and healthy would carry the old and feeble to the place of meeting.

When we compare the Aleuts with the Kadiaks, their neighbors, in a religious sense, there seems to be a great disparity. The Kadiaks practice shamanism to the present day, and all their former superstitions are still in full force, while among the Aleuts the former does not exist at all and the latter have almost disappeared. Only about one hundredth part of the Kadiaks fulfill these observances to any extent, and very few show any ardor or interest, while the Aleuts are, in that respect, not behind the best Christians of our time. Such a difference is all the more astonishing because the Kadiaks have enjoyed the benefits of missionaries among them since 1794, but the Aleuts have had a resident priest among them only since 1824, having up to that time seen only Father Makar, their baptizer, once, and for a very short time; and only two chaplains of naval vessels, in 1792 and 1821, also for a very short period, and then only at the principal village. This is not a place to decide why the Kadiaks, with every facility for

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that position night after night in order that the hidden child might come and nurse and not disturb the virtuous women. Whenever there was evidence that a woman had nursed an infant during the night, her sin was forgiven. Sometimes a woman thus locked up would cry out in the night, and the men, with arms in their hands, would hurriedly enter the hut, when in her arms was found not a babe, but a small black bird. This bird was killed with certain ceremonies, and torn into small fragments, and the nightly disturbance ceased forever.

Christianization, have remained only half Christians, but it would be very curious to find a reason why the Aleuts so commonly and almost suddenly changed their belief—their simple and easy belief—for the very strictest, and why they show so much more interest than their neighbors. The principal reason for this I believe to lie in their character. The Oonalashkans have more good qualities than bad, and consequently the seeds of the word of God find better and deeper soil and grow with greater speed. It must be acknowledged, however, that the contempt in which the shamans were held facilitated the work of the mission. Any other stronger reason inducing the Aleuts to accept their faith I can not find. It is true we may say the Aleuts accepted Christianity because they had only a very vague and unsatisfactory belief that did not satisfy the demands of their souls, and that they had reason to fear the Russians and were eager to please them; and, third and last, because the acceptance of Christianity exempted them from the payment of tribute. All these reasons may have induced them to change their faith, but certainly could not make them the earnest observers of its rules that they are; but when we come to scrutinize these reasons they appear but weak. It is true that their former religion was unsatisfactory, but could the Christian faith be any more so to them at first? In the absence of good interpreters they could have but incomplete understanding of God and His attributes; and could even that Christian faith be satisfying to their hearts when the first preacher of the same could not express himself sufficiently well in their language to explain its most beneficial mysteries, and forbade their own custom of polygamy? The Aleuts are very subservient, but we must acknowledge that the Russians never attempted to compel them to baptism in any way. As the most powerful reason may be considered the exemption of new converts from the payment of tribute, especially since they thereby escaped the dreaded oppression of tribute gatherers; but if we consider the trifling value of such tribute, which they paid only at their option, and also that the exemption only continued for three years, even this reason appears insufficient to account for their earnestness in accepting the new faith.

The Christian faith was carried to America (I mean only Russian America) by the Russians. The commander of the first vessel which discovered the Aleutian Islands, Glottof, and his companions, were the first propagandists of Christianity in America. Glottof, during the first time of his stay at Umnak, in 1759, established such friendly relations with the native inhabitants that the chief allowed him to baptize his son and carry him away to Kamchatka. He lived here several years, and learned the Russian language and grammar, and then returned to his country in the capacity of supreme chief over all the islands. This convert, who may be considered the first among all our Americans, was named Ivan, with the surname of Glottof. He assisted greatly in spreading Christianity among the Aleuts. It is unknown that Glottof and his companions baptized anybody except the son of the chief, but we know that they erected at that place a large cross, on the site of which a chapel was subsequently erected in honor of St. Nicholas, and in 1826 was replaced by a new one.[1]

For sometime after Glottof's visit to the island the Russians in the Oonalashka district forgot to baptize any more Aleuts, being occupied solely with their "pacification," as they called it, or rather extermination, and not before 1780, when the so-called pacification ceased, did the Russians once more begin to think of this subject. It was not so much Christian ardor as business considerations that induced the Russians to persuade the Aleuts to the acceptance of baptism, since the converted natives became more manageable, and attached, to a certain extent, to their godfathers, giving their trade exclusively to them. What ever the reasons were, the fact remains the same, that the first Russian hunters were the first baptizers of the Aleuts, and subsequently of the Kadiaks, thus paving the way and facilitating the work of the missionaries coming after them.

Shelikhof, the founder of the present company, included in his plans for the development of the Russian colonies the spread of Christianity and the erection of churches, and therefore on his return from Kadiak, in 1787, he petitioned the Government for the appointment of a mission, which he promised to transport to the field of action and maintain at the sole expense of himself and his partners. His petition was answered, and a mission was detailed by the holy synod, under the command of the archimandrite Ioassaf, for preaching the word of God to the tribes annexed to the Russian dominion. A mission was fitted out with everything, and even with more than was necessary, by Shelikhof and his partners, and departed from St. Petersburg in 1793, arriving at Kadiak in the following autumn, where they began their labors at once.[2]

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[1] This cross was in course of time used by some Russians in the construction of a house for the posts of a sleeping platform, very unnecessarily; but old men and eye-witnesses assert that as soon as the men began to sleep on the platform an unknown disease broke out among them, and one-half of those living in the house died, while the Aleuts living around them remained in good health.

[2] The personnel of this first mission was as follows:

1st. The archimandrite Ioassaf. He returned to Irkutsk in 1797 for promotion to the grade of archierey, and in returning from there to Kadiak he was drowned with all the occupants of the ship *Phœnix*.

2d. The archimandrite Ierомonakh Juvenal (who had once been a mining engineer) was killed by the natives in 1796 near lake Ilyamna.

3d. Archimandrite Makar, the Christianizer of the Aleuts, returned to Irkutsk in 1796, and on his return, in the suite of the bishop, was drowned with him.

4th. Archimandrite Afanassy filled the office of priest at Kadiak until 1825, and then returned to Irkutsk.

5th. Ierodiakon Stefan (also a former officer) was drowned in the suite of the bishop.

6th. The archimandrite Ierodiakon Nakar returned to Irkutsk in 1806, and died there eight years later.

7th. The monk Ioassaf died at Kadiak in 1823.

8th. The monk Herman died at Kadiak in 1837—the last member of the Kadiak mission.

Juvenal first visited Kadiak and baptized all the inhabitants; in the following year, 1795, he went to Nuchek, where he baptized 700 Chugachs, and then proceeded to Kenai and baptized all the people there; in 1796 he crossed over to the Aliaska Peninsula and penetrated to the lake Ilyamna, where he ended his apostolic services with his life, having done more service to the church than all his companions. The cause of his death was his strong opposition to polygamy. It is said that when he was attacked by the savage Juvenal did neither fly nor defend himself, which he might have done successfully, but delivered himself unresistingly into the hands of his murderers, asking only for the safety of his companions, which was granted. The savages relate that after the missionary had been killed he rose up once more, walked toward his murderers, and spoke to them; they fell upon him again, but he repeated his miracle several times. At last the savages became exasperated and cut him into pieces, and then only did the preacher of the word of God become silent. Father Makar proceeded to Oonalaska in 1795, and traveled over the whole district from Oonga to the Four Mountains, and baptized all Aleuts without exception. The other members of the mission confined their activity to holding services in the churches at their respective locations and teaching children in the schools, but Herman began from the very first a secluded life on a small island (Spruce Island), devoting himself to prayer and agriculture. Subsequently he taught a few girls, orphans, in the Russian language and manual labor, and this small establishment was in a very good condition when visited by Baron Wrangell. Among the work of the Kadiak mission must be mentioned that in 1806 the monk, Gideon, who visited the island in the ship *Neva*, translated the Lord's prayer into the Kadiak language, and it was sung in the churches after that time. Subsequently, however, it was neglected and finally lost. Mr. Shelikhof, who considered such a man not equal to the work of spreading the word of God in such a vast region, represented to the Government the necessity for additional action, but the drowning of the bishop appointed and the death of Shelikhof himself put an end for the time being to the enterprise.

Baranof, having established Sitka, asked for a priest, and in 1816 the priest Alexei Sokolof arrived there. Subsequently, when the charter of the Russian-American Company was renewed, in 1821, they were ordered to maintain a sufficient number of priests in the colonies. The company petitioned to have them sent out, and the prayer was granted. Veniaminof arrived in Alaska in 1823; Frumenty Mordovskoi entered Kadiak in 1824, and a creole, born at Atka, Yakof Netzvetof, was assigned to his native island in 1825. This last-named worthy pastor did much toward the spread of the Christian faith; he subsequently transcribed my translations of the Evangel and catechism from the Oonalashkan into the Atkan dialect.

At the present time we have in our American colonies four churches, one at Sitka in honor of the archangel Michael, established in 1817; the second at Kadiak, in the name of the elevation of the cross, established in 1795; the third at Oonalashka, in honor of the resurrection of Christ, established in 1824; the fourth at Atka, in the name of St. Nicholas, established in 1825. Nushegak and the Rédoute St. Michael in the north have remained thus far without priests, since the priest of Kadiak, to whom the former properly belongs, finds it impossible to visit it, and the Oonalashka priest can do so but rarely. Many converts have been made in that region, and a church or mission will doubtless be established there before long. The following translations have been made in the Aleut tongue to assist in the spread of Christianity: A brief catechism that was printed by permission of the holy synod in 1831, at the instance of the American-Russian Company. The Evangel of Matthew, which the holy synod allowed to be used in manuscript, and a pamphlet entitled Guide to the Short Route to the Heavenly Kingdom was also used in manuscript. To the honor of the Aleuts it must be stated that they eagerly read these books as soon as presented to them in their own tongue.

DESCRIPTION OF FORMER CUSTOMS AND BELIEFS OF THE ATKA ALEUTS.[1]

The Atka Aleuts, or the inhabitants of the Andreanof, Rat, and Bering Islands, situated between the Oonalashka district and Kamchatka, are of the same tribe or nationality as the Oonalashka Aleuts. This is proved by their language, customs, character, and outward appearance.

The Atkans believed that all the inhabitants of the islands known to them originated from one couple that came from heaven to the island named Tanaga, one of their group. The Atkans, like their brethren of Oonalashka, believed in shamanism—that is, though they acknowledged a creator, they also believed in powerful spirits. The Supreme Being they called Kouyudam Agougou and also Achidan Agougou; the first signifies creator of heaven, and the second creator of the lower regions; to intervene between mortals and spirits, and to decide which of them was to be most respected, was the business of the shamans. The demonology of the Atkans was very complicated. They also believed in certain birds, fishes, and other creatures, together with the sun, the heavens, and other inanimate objects, thinking that spirits lived in them. As communication with spirits was carried on only through the medium of shamans, they imagined that these spirits looked as the shamans appeared during their ceremonies and dances, with masks or disfigured countenances. Such masks and faces were still seen by the priest above mentioned. He says that they are generally well executed, representing the heads of animals in an exaggerated form. Some of the Atkans ascertained that in certain inaccessible localities there were colossal beings of human shape, called Taiagouligouk, to whom sacrifices or offerings were brought, consisting of paints, skins, pebbles, and fine sinew thread, but there was no open idol worship, and even this approach to it was considered dangerous among the people. They believed that idols might occasionally be of assistance to those who had made them, but though they complied at a certain time with the wishes and demands of their worshipers they finally proved their destruction,

[1] Communicated to Veniaminof by Father Yakof.

and sometimes a whole family or tribe was annihilated for daring to visit the locality where the idol was kept, and therefore it was strictly forbidden to make such figures. But the shamans continued to foster the worship, and instances of the same have been discovered often since Christianity was introduced in the Atkan district. Especially was this the case among the inhabitants of the island of Attoo, where the last secret orgies were held. Idol worship was finally broken up by the priest during his visit in 1827. The Atkans relate that on one of their islands, named Sagougamak, on a bay named Ousamkoukh, about half way up the mountain, there had been erected an idol by some shamans which destroyed at sight all who passed by. They all had seen it and knew that it destroyed their brethren, but they did not know where and how tney were destroyed until finally one of them sacrificed himself for the purpose of ascertaining the place where the Aleuts disappeared. Having resolved upon his undertaking he went to the dreaded vicinity, taking with him his wife, whom he hid in the interior of his bidarka. Arriving on the spot he sat down his wife in a place of concealment and told her to watch him, while he himself went on farther and camped; his wife saw that something emerged from the idol, proceeded toward her husband, killed him, and carried him off to a cave. She returned home and related the occurrence. The Aleuts at once collected in large numbers, proceeded to the idol and killed the spirit operating the same, and after that the bay was safe. They also said that about the year 1814 an idol was found on the island of Kanaga which gave signs of life; and in 1827 a similar discovery was made on Adakh Island by two Aleuts, who saw the spirit come out of the cave. The first idol was destroyed by being broken up, but the second was killed with a gun and then shattered and burned.

The Atkans also believed that the souls of dead people did not die, but separated from the body and lived, scattering everywhere, without any permanent place of abode. The Atka shamans, as a rule, were men, but a few women have been known in the profession. According to the belief of the people the shamans had intercourse with spirits, and the power to summon them in cases of necessity; they foretold the future; they threatened those who showed them disrespect with various punishments; cured the sick, and assisted the hunters in their pursuits, etc.; consequently the more prominent or skillful among them were held in considerable respect. For curing diseases or bringing good luck to hunters the shamans generally employed the roots of plants, and sometimes of dwarf willow and birch, pieces of which were considered as valuable gifts. If the prophecies or assistance of shamans proved successful they demanded from their clients offerings to the spirit most respected by them, while they themselves were satisfied with what their clients were willing to give. One of the common occupations of the shamans was the manufacture of masks and faces, and sometimes of charms and nostrums. They also superintended games and dances, composed songs, etc. For all such doings they had certain localities where no unclean person or woman was allowed to enter. In order to keep themselves and their belongings beyond the influence of any unclean being the shamans frequently washed themselves, their clothing, and their implements in the water of running streams.

The Atkans, like their brethren of Oonalashka district, strictly prohibit the betrayal of secrets to other tribes as leading to quarrels, murder, and war. They also prohibit laziness, theft, willful abuse; to avenge a wrong even by the most violent means was not only considered praiseworthy, but an unavoidable duty; respect for parents and for the aged and gratitude to benefactors were considered virtues. To kill a man for cause was considered just and allowable. Such causes were a violation of the marriage bed, a refusal to fight for the community, treason, or secret intercourse with other tribes. The punishment for these crimes was sometimes carried so far as to include the wife of the offender; but children, especially small children, were always spared. They had no general punishment for crimes; each one was supposed to deal with his own enemies. Theft was not suffered among them at all; a house in which theft or robbery had been committed was at once leveled to the ground and rebuilt in another place with certain ceremonies; then a shaman with a few other men entered the new building, burning certain herbs and going through various ceremonies, in order to find out the guilty one. It was believed that the ashes of the burned herbs would fly into the face of the thief. Once discovered, the guilty man was stripped and beaten. A very remarkable custom among the Atkans is the "purification," which they call *aliag*. Sodomy, and too early cohabitation with a betrothed or intended wife, are called among them grave sins. The manner of purification was this: The offender desirous of unburdening himself selected a time when the sun was clear and unobscured; he picked up certain weeds and carried them about his person then deposited them and threw his sin upon them, calling the sun as a witness, and, when he had eased his heart of all that had weighed upon it, he threw his grass or weeds into the fire, and after that considered himself cleansed of his sin.

The Atkans, like other savages, did not know the value of their lives, and therefore in disasters they were easily overcome by their feelings and deprived themselves of their lives. Grief over the death of relatives—a son, cousin, husband, or wife, etc.—often led to suicide; but there were no examples of children depriving themselves of their lives from grief over the death of their parents, no matter how dearly they had loved them. This was probably considered as a law. It occurred also that men committed suicide from disappointment at the failure of an undertaking, fearing that they would become the laughingstock of the village. Sometimes they preferred death to capture among their enemies, for all prisoners of war were slaves the remainder of their lives.

The Atkans allowed intermarriage between all relatives, with the exception of a brother to a sister, father with his daughter, and son with his mother; and in case of the death of one brother the other was obliged to marry the widow. Marriage was contracted at 10 years of age, the time when a boy was considered able to manage a bidarka and throw a spear, and consequently was counted among the hunters, while the girl was able to sew. Sometimes the parents betrothed their children to each other. As soon as such an engagement had been resolved upon the parents presented the children with household utensils, clothing, hunting gear, etc., but the marriage was only considered as binding when the young couple had brought forth children. At that time it was the custom to present them with

slaves; and the refusal of an offer was considered a great insult, for which the most severe measure of vengeance might be instituted, even to death. Men were allowed to have two or more wives, but only very few had more than two. They were very jealous of their wives, and adulterers were subjects of cruel vengeance, and this crime often led to intertribal wars. The love of parents for their children and of children for their parents was as exemplary as among the Oonalashkans. The parents managed their children strictly, teaching them everything necessary for their comfort without permitting them to follow their own inclination, even setting apart certain hours when they might leave them temporarily. Brothers and sisters were not allowed to play with each other. For disobedience and trifling offenses the punishment was only a reprimand, but for a graver infraction of rules the children were made to fast a day or more. The parents were always willing to intrust the education of their children to relatives, or even strange people. It was also the custom to give away children for adoption, sometimes without consideration, but generally expecting some return. These adopted children were accorded all the rights of real children of their new parents.

The mode of burial differed in accordance with the social condition of the deceased. The nobles, the wealthy, or prominent, distinguished hunters were buried with special ceremonies. A corpse of this class was clothed in its best garments and deposited in a small structure of earth, ornamented as much as possible with mats and flowers; the deceased was seated with his knees drawn up to the chin; then the structure was covered over and closed. If the deceased had been a hunter, all his hunting utensils were buried with him. The poor and common people were simply thrown into holes, but also in a sitting posture. Men who died at sea were generally eviscerated for the purpose of postponing decomposition. The entrails were burned separately. Relatives of the deceased individual killed slaves in his honor, or as proof of their love for him or their violent grief—customs observed by other American tribes. Near relatives of the dead continued a general lamentation for several days; during this time they fasted; they did not partake of meat or oily food, such as fish heads, and they kept themselves clean; and even husband and wife did not cohabit during the time of mourning. Those who were very much attached to the deceased, if they did not commit suicide during the first paroxysm of grief, often fasted almost to starvation, and frequently visited the place of burial to mourn and lament, giving away to the people large quantities of valuables in memory of the dead. When children died, the parents did not weep, with the exception of cases where children died before having any teeth; in that case the father fasted ten days and the mother twenty. The wife at the death of her husband, and the husband at the death of his wife, kept a fast and lament for sixty days, beginning from the eleventh day after the death; but if the husband died or perished at sea the days of mourning and fasting were reduced by half. At the conclusion of the mourning period the widows or widowers might contract a new marriage.

The government of the Atkans was patriarchal and liberal. They had no laws or rules; customs and traditions were their only guide. They had hereditary tribal commanders, like other American nations, but their power was limited and conditional; they were only obeyed by those who chose to listen. Their power consisted principally in the office of selecting men to perform certain labor for the common welfare; to divide whales cast up by the sea, to collect the forces in cases of emergency, and act as leaders during battles with the enemy. But on such occasions it was necessary that they should conduct themselves bravely and be ahead of everybody; if one acted otherwise some "brave" was at once selected to replace him, and such individual was at once invested with all the prerogatives of a chief. Chiefs who displayed extraordinary cowardice were deprived not only of rank, but of their property.

Special days or periods of repose they did not know, but whenever there was any occasion for feasting, such as the arrival of strangers, the return of parties from long voyages, victories over an enemy, or uncommon success in hunting, a season of rejoicing was at once instituted. Their celebrations consisted generally of scenic representations, with songs to the accompaniment of drums; masks were also used at such times, and other ornaments according to the subject represented by the actors. Frequently shamanism entered into such solemnities; shamans were always present on such occasions, and were consulted in the shaping of masks or disguises. These festivities began and frequently ended with feastings. The fare consisted only of local products, all marine animals except the "killer" whale, all birds with the exception of the hawk, eagle, and gull. All fishes and all known berries and roots were consumed as food, but the most luscious morsel was a mixture of sarana root and berries with blubber.

The Atkans had also special games for evenings, during which personal encounters or trials of endurance took place. The contests sometimes were of songs, sometimes of dances, and, rarely, a rude kind of wrestling; formal challenges were sent and accepted on such occasions, and a failure to be ready at the appointed time was considered a disgrace. The whole proceedings were of a friendly nature and were generally accompanied with feasting, always with songs and dances. In course of time abuses entered into this custom, and contestants and enemies made use of such opportunities to inflict injury upon each other. Open breaches of the peace and murder were of exceedingly rare occurrence on such occasions.

The Atkans, as well as the Oonalashkans, maintain that there was a time when they all lived at peace with each other and with their neighbors, but subsequently quarrels broke out, and finally it became customary for inhabitants of different villages to attack each other and destroy houses and property. Only the permanent residence of Russians among them put an end to internal strife and murder, and the adoption of the Christian religion only changed their character and united as brethren those who had formerly been engaged in strife. The bloodiest wars previous to the arrival of the Russians were carried on by the Atkhans with their neighbors of Oonalashka; the latter, being the more numerous, were generally victors.

They say that the first cause of war between them was the following occurrence: One of the Oonalashkans had married a native of Atka, and had a son by her, who, unfortunately, had only one hand at birth. At one time the

relatives and brothers of the wife came to the village and stopped. The husband at this time was away at some distance; the uncles and relatives noticed their one-hand nephew, and began to make fun of him. They tied to his body an inflated bladder, or drum, and told him to dance. To the mother such sport, though perhaps innocent in itself, appeared an insult, but she did not exhibit her anger. The guests departed in peace, without suspicion of coming evil. When the husband returned she told him everything—that her relatives had made sport of their unfortunate son. The husband became very angry, and, collecting a few of his relatives, he set out at once to seek revenge. He carried out his intention very easily, as his former guests had no inkling of being pursued. This first errand of vengeance gave rise to continued hostilities between the Atkans and the Oonalashkans, and to a repetition of the first attack. The Oonalashkans, of course, considered themselves as insulted and injured, and in their turn attacked the Atkhans. In course of time it became impossible for members of the two tribes to meet without a bloody conflict, but the Atkhans suffered much more, because they were weaker; and, not daring to attack the villages of their enemies, they were obliged to watch their opportunities when the Oonalashkans were on journeys at distant hunting grounds. These conflicts generally took place on Siguam, Amlia, and Amukhta islands. The Oonalashkans, on the other hand, raided upon the Atkans every year in numbers of from fifty to one hundred bidarkas. This was carried on to such an extent that the Atkans were obliged to shut themselves up during the summer in secluded and inaccessible fortified places, but even then they were often besieged and compelled to surrender. The islands of Siguam and Amlia were generally the theater of war.

Though unable to return the attacks of the Oonalashkans, the Atkans occasionally made war upon the Rat and Near islands as far as Attoo, and only with partial success. They used the same weapons as the Oonalashkans—lances and knives. The prisoners, especially the males, were treated by the Atkans with great cruelty, and those who were made slaves were fortunate indeed; the others were burned alive in fire, roasted on heated rocks, and beaten with clubs.

The Atkans, as well as the Oonalashkans and other tribes, believed, until the arrival of Europeans, that they were the only people in the world, and therefore the first appearance of the Russians created great consternation. All such acts of the Russians as were incomprehensible to them were ascribed to supernatural qualities, and in the early times the Russians were classed with spirits or with devils. This character was maintained by the Russians subsequently by their cruelties and violent treatment of the Aleuts. Any article of Russian manufacture found upon the beach was considered as unclean, and was at once thrown into the sea or burned. At first the use of iron or copper was strictly prohibited by the shamans; but where there is a rule there is always a violation of the rule. The Aleuts became more bold, and convinced themselves of the superiority of metals for spears and arrow heads, knives, etc., and subsequently they became better acquainted with the Russians and their customs, and iron and copper became the most valuable objects in their eyes, though the belief continued that they were manufactured with the assistance of the devil.

DIVISION OF TIME.

The Aleuts had twelve months in their year, the eleventh of which was longer than the others, to complete the full year. Their seasons were:

Kanakh, winter; *kanikinga* (after winter), spring

Sakoidakh, summer; *sakoidikinga* (after summer), autumn.

The milky way was called *inim sighidá*, from *sighidak*, *linia alba* (from the navel downward).

Their months were as follows:

1. March—*Kadoogikh* (first month), or *Khisagoonakh* (when straps are eaten—starvation).
2. April—*Agliooõgikh khisagoonakh* (end of eating straps), or *Sadáigan kagikh* (time for leaving houses).
3. May—*Ichikh khookh*, or *Chigūm tugida* (month of flowers).
4. June—*Chagalilim tugida*, *or Chagaligim tugida* (month of breeding and hatching).
5. July—*Sagidnam tugida* (when animals grow fat).
6. August—*Oognam* (or *Ùkhnam*) *tugida* (warm month).
7. September—*Chugūlim tugida* (when furs are good).
8. October—*Kimadgim tugida* (hunting month, when seals come from the north).
9. November—*Kimadgim kangin* (after hunting month).
10. December—*Agalgūgakh*, or *Agalgālukh* (when seals are hunted in disguise).
11. January—*Tugidigámakh* (long month).
12. February—*Anulgiliakh* (cormorant month).

III. THE ATHABASKANS.

The Athabaskans, or Tinneh, include a large number of tribes generally classed as "North American Indians," extending from the mouth of the Mackenzie River in the north to the borders of Mexico in the south. The northernmost tribes of this stock extend in a westerly direction

nearly to the coast of Bering Sea and the Yukon Delta, touching the seacoast at one point in the northern part of Cook Inlet. At every other point they are separated from the ocean by a belt of Eskimo population. The reasons for adopting the term Athabaskan in preference to that of Tinneh have already been given.

Closely allied as these tribes are to our own well-known Indians of the interior, they will probably share in the fate of the latter, disappearing rapidly before the first advances of civilization, until scarcely enough may be left to accommodate themselves to the new state of affairs. While the Eskimo tribes of Alaska, especially those living to the southward of Bering Strait, have the faculty of assimilating with races of a higher type, the Athabaskans of the far north have thus far displayed no traits which would warrant us to hope for their speedy civilization. The territory which furnishes the Athabaskan tribes, numbering a few hundreds, or perhaps thousands, with a scanty living equals in superficial area many of our States or Territories. With the exception of the Tinnats or Kenai people, on Cook Inlet, these tribes have not been in direct contact with Caucasians until quite lately, and with the one exception before mentioned they have not taken kindly to the invaders of their vast domain. Nearly all the Athabaskan tribes of Alaska add to their tribal name proper the word *khotana*, *kokhtana*, or *tena*. A few tribes on the upper Yukon have the term *kutchin*, with the same meaning. It is very probable, however, that this *kutchin* may be traced to the same root as the above-mentioned *kokhtana*, and perhaps to the *khuilchan* (*kolchan* or *golchan* of the Russians.) The latter expression means "far-away people" with the natives of Copper River, and also with the Tinnats or Kenai people.

In enumerating the Athabaskan tribes of Alaska we begin with

THE NATSIT-KUTCHIN.

The Natsit-kutchin (Natsikkutchin of Dall, and Natchekutchin of Ross) are known to the traders as *gens de large*. The word *natsit* signifies strong. They are nomadic, not numerous, and occupy the banks of the Porcupine River above its junction with the Yukon, and the country between the latter river and the Arctic divide. They are but little known, and carry on a traffic with the Kangmaligmute of the Arctic coasts. Their dwellings are rudely constructed log shelters, and during the summer they live in tents.

THE HAN-KUTCHIN.

The Han-kutchin, living on the upper Yukon River, between the British boundary and Fort Yukon, embrace several of the subdivisions made by Mr. Dall, such as the Tutchonekutchin (Kolchane) and Nehannees. To traders they are known as *gens des faux*. They also lead a nomadic life, and trade with the natives of Copper River and those of the upper Tanana River.

THE YUKONIKHOTANA.

This tribe, comprising the Yunakhotana and the Kutchakutchin of Dall, inhabits the banks of the Yukon River from Fort Yukon westward to Nulato. The people are less nomadic in their habits than their eastern neighbors, but are by no means numerous. Their dwellings are built of logs and roofed with bark, and their summer garments are of tanned moose and reindeer skins, while those for winter use are made of reindeer, wolf, and fox skins. They trade at various points along the Yukon, but prefer to assemble at Noyakakat and Nuklukaiet. Their tribal name signifies "men of the Yukon." The existence of totems among them has not been definitely ascertained, though we have many indications of their division into clans. In distinction from their neighbors of the west and north they do not use their dogs as draught animals, but only for hunting. In winter and summer alike they carry such loads as they wish to transport upon their shoulders. They are, as a rule, tall and of spare habit. Their women are worn out and faded at an early age, having in true Indian style to bear most of the household burdens. They are polygamists, in spite of the fact that the males outnumber the females considerably in the majority of the settlements. They have no marriage ceremony, but the

custom of purchasing wives, found among so many of the Athabaskans, does not exist among them. They are not copper colored, being rather of an ashy hue, and they are less hairy than their Eskimo neighbors.

THE TENNANKUTCHIN.

The Tennankutchin (Mountain Men), or Tennan-tnu-kokhtana (Mountain River Men) as they are called by the Tinnats, occupy the mountainous basin of the Tanana River. But few white men have penetrated into their domain, as they have always borne the character of a treacherous and warlike tribe. They number, perhaps, seven or eight hundred, living chiefly in villages near the headwaters of the river, which they descend during the summer in birch-bark canoes to trade on the neutral ground of Nuklukaiet, at the junction of the Tanana with the Yukon River. Their common dress consists of moose-skin shirts and pantaloons for both sexes, the difference consisting only in the shape of the skirt of the upper garment, which is rounded with the females and pointed with the males. Both sexes are fond of bead and porcupine-quill embroidery. They paint their faces, and on festive occasions powder their unkempt locks with eagle down, after the fashion of the Kaniagmute, in the far southeast. In summer the men wear no head-covering but a narrow band of skin for the insertion of feathers. The accompanying plate represents two individuals of this tribe, who were the first to visit the seacoast, in the year 1880. They have been known to trade with the Kenai people in ancient times, and are reported to possess a system of totems.

THE YUNNAKAKHOTANA.

The Yunnakakhotana, first named by Zagoskin, inhabit the Koyukuk River, the northern tributary of the Yukon. The name signifies "far-away people," and was probably given to them by their southern neighbors, but Mr. Dall calls them Koyukokhotana. Zagoskin is the only white man who has ever visited them in their homes. He made a winter journey along the river and across the divide to the head waters of Selawik River, which empties into Kotzebue Sound. He describes them as living in small communities of one or two log houses, widely scattered. The Yunnakakhotana trade alternately at Nulato on the Yukon, and with the Eskimo of Kotzebue Sound. Mr. E. W. Nelson reports that he saw natives belonging to this tribe on the coast of Kotzebue Sound who had mixed with their Eskimo neighbors to such an extent as to have adopted their language while still retaining their distinctly Athabaskan physical features.

Misled, probably, by his imperfect knowledge of the Russian language, Mr. Dall has mentioned Zagoskin (and upon his authority Wrangell and Baer) as classing these people with the Innuit or Eskimo. In this he is mistaken, as Zagoskin drew a very distinct line between his Tinnai and the Kngyulit or Eskimo everywhere, locating the boundaries between the tribes with remarkable correctness.

THE KAINHKHOTANA.

The Kainhkhotana, comprising the people of both banks of the Yukon from Nulato down to Paimute (the eastern boundary of the Eskimo tribes on the Yukon), as well as the tribes living upon the banks of the Chageluk, Innoko, and Thlegon rivers, formerly classed as Ingalit or Inkalik, are the westernmost of the Alaskan Athabaskans, almost impinging upon the seacoast at the head waters of the Anvik River. The tribal name means "lowlanders." Like their eastern neighbors, the Kainhkhotana live chiefly by hunting, and engage in fishing only to eke out scanty supplies. They live in permanent villages and make use of dogs as draft animals, having adopted, in addition, many customs of their Eskimo neighbors on the west. In traveling on the river and on the lakes they make use of both the birch-bark canoe and the kaiak. The latter, however, is not manufactured by themselves but purchased from the Eskimo, who in their turn, as before mentioned, have adopted the birch-bark canoe for certain purposes. The Kainhkhotana have also adopted from the Eskimo the frequent celebration of festivals and the rites of shamanism. Their dwellings are large and partly underground, with a superstructure of logs and sods. The kashga or council house of the Eskimo is absent here, and festivals are held in the larger dwellings. No traces of the totemic system have been found. During one of their

festivals, connected in some way with hunting reindeer, which the writer witnessed on the Chageluk River, the following representation took place: Two men, who had been donning their costumes behind a screen of deerskins, suddenly appeared in the center of the house, the sides of which were lined with spectators. One man was attired in a fantastic hunting costume, richly ornamented with beads, fringes, and tassels, and wearing a band around the head studded with eagles' feathers, and with bow and arrows in his hands. The stuffed skins of several animals and birds were drawn forth from some corner in rapid succession by means of strings, and as each animal appeared the hunter made an attempt to kill it. Every attempt, however, was foiled by the other man, who was dressed up in imitation of a raven, with the appropriate mask and with wings fastened to his arms. With these wings he would spoil the hunter's aim, and then hop about, imitating admirably the awkward jumping of the crow, while he kept chattering away in derision of the awkward hunter. This was kept up for some time, until a shaman or sorcerer appeared upon the scene, dressed up in a long hunting shirt nearly covered with strings of bears' claws, eagles' beaks, beads, etc., and with rattles in both hands. The shaman pressed upon the hunter the acceptance of a charm or amulet, for which he received in payment nearly everything the hunter had about him. Then the animals began to appear again, the hunter slaying them one after another without any further interference from the raven. It was evidently unnecessary to look for any deep meaning in this performance, as it was only the shaman's advertisement of his charms and services pure and simple. In such festivals as are celebrated in memory of the dead the performances are more varied and of greater interest.

The Kainhkhotana, like most of their Athabaskan neighbors, deposit the bodies of their dead in boxes raised on posts somewhat above the ground. Flags and streamers of white cotton are frequently attached to these structures. The burial places are generally located upon some prominent bluff overhanging the river, where the graves can be seen from a distance.

THE KHUILCHAN.

The Khuilchan, or Kolchane of the Russians, occupy the vast interior mountainous region bordering upon the upper Kuskokwim, the divide between the latter river and the Tanana in the north, the main Alaskan range in the east and south, and the country of the Nushegagmute in the west. They are nomads, roaming about at will from river to river, and from one mountain chain to another, selling their skins at the trading posts nearest their hunting grounds. This last custom has given rise to an overestimation of their number, as the same tribes have been accounted for as trading at three or four different stations. Their whole number at present probably does not reach 200. The many traditions of their treacherous and warlike character handed down to us by the Russians may safely be looked upon as fabulous. Living as they do, they could never have been a numerous people or the cause of danger to their neighbors. It is said that they have some permanent villages on the head waters of the Kuskokwim, but no white man has ever beheld them. Such of the women as have been seen at the various trading stations were of repulsive appearance, and gave evidence of a life of hardship and abuse. The Khuilchan use birch-bark canoes, and do not make use of the dogs as draft animals.

THE TINNATS (OR KINNATS) KHOTANA.

The Tinnats-khotana (Kenaitze of the Russians), named Tehaninkutchin by Dall, are the only tribe of Athabaskans occupying any portion of the seacoast in Alaska. They came into contact with the Russians at an early date, but were subjugated only after much fighting. As early as 1789 permanent trading stations were estabiished among them on the coast of Cook Inlet by the Russians, and from that time they have been nominally Christians. Their regular missionary station is now located on the mouth of the Kaknu River. The settlements of the Tinnats-khotana extend from Kuchemak Gulf on the Kenai Peninsula around the inlet northward and westward, including the valleys of the Kinik and Sushitna rivers, and reaching to the great lake of Ilyamna, and down to the vicinity of Cape Douglas, where the Kaniagmute territory begins. The Tinnats-khotana are taller than their Eskimo neighbors; their skin is a shade or two darker, with the exception of those living in the neighborhood of former Russian settlements, where they have

intermingled with the invaders. Their women are generally much more prepossessing in personal appearance than those of the other Athabaskan tribes of Alaska. In the coast settlements their mode of life has been much changed. They have adopted to a great extent the customs of the semicivilized Kaniagmute and creoles, but in the interior, especially in the Sushitna and Kinik valleys, we find them still dressed in deer-skin shirt and trousers, men and women alike—a practice clearly indicating their kinship to the northern Athabaskans. Many of their garments are tastefully embellished by porcupine quills, beads, and grass plaiting. The ears and noses of the men are pierced for the insertion of pendants of dentalium or hyqua shells, this being almost the only section of the territory where the trader still finds a steady demand for these shells. In the interior these people use the birch-bark canoe exclusively for coast voyages and for the purpose of hunting the beluga, purchasing the bidarkas they use from their Eskimo neighbors. They build their permanent dwellings of logs. These logs are so fashioned that the under side, hollowed out, fits down tight, almost air-tight, upon the rounded surface of the timber next below. Some of their houses are from 15 to 20 feet square, and have regular rafters, giving a pitch to the roof sufficient to shed rain and melting snow. The covering of the roof is the bark of spruce trees. The fireplace is in the center, with a smoke hole directly above it. The entrance to the house consists of a low, square aperture, scarcely large enough to admit an adult person. The floor consists of the natural earth trodden hard, and along the sides of the inclosure are rude platforms, erected a foot or two from the ground, covered with grass mats and skins, and serving as sleeping and lounging places in the evening. In the houses of the well-to-do hunters we find wings or box-like additions to the main building, tightly framed and put together, opening into the main room. These little additions are furnished with the luxury of a rough plank floor, and in many instances with a small window covered with fish gut. They are used in winter as sleeping apartments, and as reception rooms during visits of ceremony, and also as bathrooms, being heated during the winter with hot stones carried in from the fire outside, thus enabling the natives to dispense with clothing during the night, which they consider a great luxury. Wherever the Tinnats-khotana are under the influence of the Russian mission they bury their dead under ground, but in more remote settlements we find the bodies deposited in boxes set upon posts, as before noticed in speaking of other Athabaskan tribes. The bodies of chiefs and prominent persons are frequently placed in a structure resembling a small house with door and window, and gifts are deposited at graves and burial places. At the death of a chief it is the custom to carry all his belongings into the hut that shelters his remains. In the vicinity of Toyoonok I saw such a burial house nearly filled with articles most valuable in the eyes of the natives, among them several Russian samovars, worth from $50 to $60 apiece, breech-loading arms, rifles, large numbers of blankets and deerskins, richly ornamented garments, etc. The deceased who had been thus honored was a Christian, and not long after my visit the Russian missionary proceeded to the burial house and carried off all articles of value and sold them at auction for the benefit of the church. No opposition was made at the time to this summary proceeding, but it is very probable that the resentment naturally caused thereby in the hearts of the natives will rankle there for years, until some opportunity presents itself for vengeance. The men of this tribe are of a taciturn disposition, but they are indefatigable hunters, and spend most of their time in the chase of fur-bearing animals and game, making long journeys into the interior through the mountain defiles and over passes, nearly always on foot, using their birch-bark canoes chiefly for crossing rivers and lakes. They build along their routes of travel here and there temporary shelters or sheds, open in front, with sloping roof, thatched with grass. Each traveling individual or party, on leaving such a place, deposits in a certain nook a small bundle of dry moss, birch bark, resin, or twigs, to enable the next comer to kindle his fire without difficulty. This hospitable and thoughtful custom is never omitted.

The Tinnats-khotana also have their festivals and dances on certain occasions, during which presents are given away to those who attend. The giver of the feast alone appears masked and dressed up in fanciful costume. The modus operandi of one of these festivals, celebrated on the occasion of a beluga hunt at the village of Chkituk, was as follows:

The invited guests who were to participate in the feast arrived in canoes late in the afternoon,

and were received on the beach by the chief of Chkituk, accompanied by nearly all his people chanting a song in slow measure. The guests took up the song, and both parties walked up to the village, the hosts carrying all the baggage and belongings of their visitors. The party proceeded at once to the house of the chief, where they were entertained hospitably during the remainder of the afternoon. Etiquette did not permit a single question to be addressed to the newcomers until they had satisfied their appetites. The greatest delicacies, berries preserved in rancid oil, beluga blubber, dried moose nose, and fish spawn, were pressed upon them without a word and partaken of in silence. At last their hunger was appeased and conversation began, which was kept up until darkness had set in. Then the chief retired into a corner of the apartment and with the aid of his two wives attired himself in his best costume, consisting of an immense hat trimmed with bears' claws and beads and a loose robe of white cotton richly embroidered with beads. In his hands he had rattles, inflated bladders filled with pebbles. He advanced to the center of the room and began to dance, two of his sons chanting and beating time with sticks. The measure increased in rapidity as the dance proceeded, involving a corresponding change in the movements of the chief, who wound up his performance with the most violent contortions. When he was thoroughly exhausted he ceased dancing and threw upon the floor a number of articles he wished to give away. The spectators, excited by the song, also produced gifts and threw them upon the others. The whole was then distributed among those present in accordance with the directions of the oldest woman present, the chief lifting up each article and the woman calling the name of the person who should have it. After this the chief changed his costume four times, performing as many dances, and after each there was a distribution of presents. This ceremonial was kept up for three successive afternoons, until the hunters departed on the journey, chanting a canoe song and keeping time with their paddles.

The Tinnats-khotana, though nominally Christians, still observe many of their old customs, one of which is the driving away of evil spirits from the couch of a dying person. I witnessed a scene of this kind in a village situated within a few miles of the missionary establishment. A woman was lying upon a wretched couch in her last moments, while her husband stood in the entrance or doorway of the house, loading and firing his gun and shouting between the discharges at the top of his voice, accompanied by a chorus of yells and groans from the other members of the household, the neighbors joining. The action appeared to be cruel and savage, but the intention was good, being to frighten away the evil spirits from the dying woman.

The Tinnats-khotana have many traditions of gigantic races, living to the northward, who in ancient times invaded their territory, killing many people. One old man assured me that during the lifetime of his grandfather one of these giants came down from the mountains, and as he strode through the villages he would pick up an unfortunate individual in each hand, swing them by their feet, and knock their heads together, after which summary proceedings he would deposit them in the breast of his parkee. It is of course out of the question that these savages should ever have heard how Polyphemus treated the companions of Ulysses. The same old man, in speaking of the tribes adjoining the Tinnats-khotana in the north, said that after crossing the mountains the traveler would first come to the Khuilchan, who were cannibals, easily distinguished by a blue ring around the mouth caused by their horrible practice. Beyond this tribe lived the giants heretofore mentioned, and still beyond them a very small race of people, almost black, but exceedingly skillful in the use of bow and arrow. Beyond this dwarf tribe again there were only water and big fish, as big as mountains. One might almost imagine from this fantastic description that the Tinnats-khotana knew of the undersized Eskimo of the Arctic coast and the whales in the Arctic Ocean. Their superstitions with regard to the various smoking and rumbling volcanoes in their country are numerous. They do not like to approach such localities, and until the Russians settled among them the immediate vicinity of volcanoes served as a refuge for the reindeer, moose, and other game, which were never molested there. They tell of an eruption of the Ilyamna volcano, during which lava and rock in huge masses were thrown across the inlet, covering up whole villages with débris. It is of course impossible to locate with accuracy the time of this fearful eruption, but all along the eastern coast of Cook Inlet are yet

found blocks of lava and conglomerate that invest the tradition with some probability. The natives also say that a pestilence followed this eruption, nearly destroying the people, This also we may believe when we glance at the large number of village sites almost hidden from view under a dense covering of sphagnous growth.

The following are the names given by the Tinnats to other tribes:

Their own name: Tinnatz or Kinnatzkokhtana.
Kaniagmute: Ultz-chna (slaves).
Chugachimute: Tatliakhtana.
Copper River: Otnokhotana.
Thlinket: Totkoliushok. [?]
Aleut: Takhayuna.
Alaska Peninsula: Nieskakh-itina.
Prairie or tundra people: Ghuil-chan.
Ilyamna people: Ktzialtana.
People of the seacoast with long spears: Tutna.
Dog drivers (in the north): Tyndysiukhtana.
Russian: Kaziakhtana (Cossack).

THE AH-TENA OR AHTNA-KHOTANA.

The Ah-tena (of Dall), a name signifying "big men," or Otno-khotana, as they are named by the Tinnats, occupy the whole basin of the Copper or Ahtnah River and its tributaries. Their permanent villages are located on the head waters of the river, a hundred miles or more from the sea. They do not number over 300 all told. Their position is that of middlemen between the Eskimo tribes of the seacoast and the Athabaskans of the far interior, their trading operations extending as far as the head waters of the Yukon and Tanana rivers. The men are tall, straight, and very active, with features resembling closely those of the typical North American Indian. Aquiline noses are the rule among the Ahtnah people. The men do not possess any beard, or perhaps remove all hair from the face after the custom of other well-known tribes. The females of this tribe have not yet come under the observation of any white men who lived to describe them. Two or three Russians who ventured to penetrate into the Copper River country were killed by the savages, and the only white man (a miner) who has made an attempt since the acquisition of Alaska by the United States, though suffered to reside in the lower Copper River region for nearly two years, was not permitted to visit the permanent village or to ascertain the mineral resources of that region. The name of the river from which this tribe has taken its name is properly Ahtnu, or "Big River," *tnu* being the word for river in their language as well as in that of the Tinnats. The party of Copper River natives who made their annual visit to the Nuchek trading post in the year 1881 gave to me, as their tribal name, Ahtnukhotana, or "Big River people." For the purpose of visiting the seacoast these people purchased large skin-covered boats of the Chugachimute or of the traders. The return journey up the river is exceedingly difficult, as at two different points glaciers have crossed the river, making long portages over the ice necessary. The men claim that they must spend from three to four weeks on their return voyage. This assertion is probably true, as they abstain from purchasing any article of weight or bulk for the purpose of their trade, confining themselves entirely to beads, a few light packages of cotton prints, and tobacco. The beads are purchased by them only for the purpose of selling them again, as they do not themselves make use of any kind of bead ornaments. Their deerskin garments are trimmed with porcupine-quill embroidery and fringes alone. They wear their hair long, either hanging loose or tied in a single scalp lock at the top of the head. The accompanying plate represents one of these Ahtnah warriors, together with an individual from their nearest neighbors in the east, the Chilkhat Thlinket. For the reasons above mentioned nothing is known of their domestic life or their beliefs and superstitions. By the Eskimo of Prince William Sound the Copper River people are called Yullit, according to the same authorities, but it is probable that this term signifies "one people."

IV. THE THLINKET.

The Thlinket, numbering perhaps somewhat over 7,000 people, and inhabiting the coast and islands from the intersection of the one hundred and forty-first meridian to the southern boundary of Alaska, are perhaps the most interesting among the native tribes of the country from an ethnological point of view. The curious totemic system is more fully developed here than it has been found with any other tribe. The ties of the totem or clanship are considered far stronger than those of blood relationship. The principal clans are those of the Raven, the Bear, the Wolf, and the Whale. Men may not marry in their own clan, and children belong to the clan of their mother. The Thlinket are strictly confined to the seacoast by the natural barrier of stupendous mountains that rise everywhere within a short distance from the shore along the whole length of their territory; hence they are emphatically a maritime people, skillful in the construction and management of their huge wooden canoes fashioned out of a single log. Nearly all their subsistence is drawn from the sea and from the rivers, with the addition of deer and mountain goat from the mountains. Their country is thickly wooded, and as a consequence their dwellings are large, being constructed of huge planks and logs, some of the latter of such dimensions as to make us wonder how these savages could handle them without mechanical appliances. In all the villages where the Thlinket live in their primitive manner totem posts, from 50 to 100 feet in height, rise up in front of nearly every dwelling, elaborately carved with the totem in all imaginable variations, and indicating in some obscure way the pedigree of the owner. The Thlinket excel in all manner of carving in wood, bone, or stone; they shape pipes, rattles, and masks with all fantastical forms, from the hardest material. The women are equally skillful in plaiting baskets from spruce roots split and soaked in water. The fibers are dyed in different colors and worked into tasteful patterns. In former times they also made a practice of weaving the long hair of the mountain goat into cloaks and blankets, in the most gorgeous colors and patterns, but since the introduction of woolen blankets and manufactured clothing this art has been neglected until now it is almost lost, but a few of these garments now existing as heirlooms in the more prominent families.

The Thlinket, like their near relatives, the natives of British Columbia, have always owned slaves, and the custom has not been abolished among them since their transfer to the United States. The slaves were always in the first place prisoners taken in war, and sold from one clan or tribe to another, but the descendants of these slaves also remained in the condition of their parents, liable to be given away, traded off, or even killed at the pleasure of their masters. The former custom of killing slaves on the death of a chief in order to furnish him with servants in the other world has become obsolete or exists only nominally, as for long years previous to the sale of the territory the Thlinket of Alaska were in the habit of accepting presents from the Russian authorities in consideration of releasing the intended victims of this practice. They resorted to the same extortion during the first year of American occupation, when the military commander at Sitka, 200 or 300 soldiers at his back, was weak enough to comply with it, and to bribe the insolent chiefs into abstaining from murder. They think any insult or injury can be repaired by payment of money or goods. The murder of a relative can be atoned for by a certain number of blankets (their common currency since their first acquaintance with Caucasians); wounds and injuries are assessed in proportion; a refusal to marry a widow of an uncle or elder brother can also be settled by the payment of blankets; wars are frequently avoided by an indemnity arrangement, and they go so far in this system of compensation that they demand payment for losses from parties who have been in no way instrumental in causing them. For instance, an Indian of Sitka broke into the room of two miners in their absence, emptied a demijohn of liquor, and died in consequence, and the relatives of the robber demanded and received payment from the unfortunate Caucasians. If a man be attacked by a savage dog, and kills him in self-defense, he must pay for the dog to the Thlinket owner. A small trading schooner, while running before a furious gale, rescued two Thlinket from a sinking canoe which had been carried to sea. The canoe was nearly as long as the schooner and could not be carried or towed, seeing which the natives cut the worthless craft adrift. When the humane captain

landed the rescued men at their village he was astonished by a peremptory demand for payment for the canoe, backed by threats of retaliation or vengeance.

The observations of the priest Veniaminof, who labored patiently among the people in the cause of Christianity, and those of several subsequent explorers, are embodied in the following summary:

The tribe or race who call themselves Thlinket (that is, man, in their own language), but who received from the Russians the names of Kaliushi, Koliushi, or Kolosh, inhabit the coast of North America from Mount Saint Elias to the Columbia River, or from latitude 60° to 45° north. The subject of my investigation, however, has been that portion of the race living north of the Nass River, or of the British boundary. Veniaminof estimated the number of the whole race at from 20,000 to 25,000 living within the Russian lines, but the estimate was made in 1840, and if it was once correct a remarkable decrease in numbers must have taken place since.

The term Kolosh, applied to the Thlinket by the Russians, is not recognized by themselves. It is a term perhaps derived from the Aleut word *kaluga*, signifying a trough or wooden dish. When the first Russians encountered the Thlinket in the vicinity of Sitka the Aleutian hunters were struck with the remarkable lip ornament of the Thlinket women, consisting of a trough-shaped disk inserted in an incision of the under lip. In speaking of these natives they probably described them as people with "kalugas," of which latter word kalushka would be the diminutive, and thus it is supposed the Russian name of the tribe originated. It is difficult to determine the authenticity of this derivation, as we meet in all sections of the former Russian colonies with provincialisms of Yakutish, Kamchatkan, and Aleutian origin. It is a significant fact, however, that the oldest authors on the subject used the term Kaliushi or Koliushi, while only the latter writers adopted the word Kolosh. In Sitka at the time of the transfer of the country the ancient form had become altogether obsolete.

Holmberg noticed that in Sitka it was the practice to address a native with the word *shniaga*, and claims that this also had become a term signifying the whole race. The Russians claimed that this expression is of Thlinket origin, but this seems to me not supported by evidence. When a Thlinket addresses a Russian he also uses the word *shniaga*, which seems to signify "friend, or good friend, listen," or something equivalent. But as there is no similar word in the Thlinket language expressing the same meaning, we may surmise that the Thlinket adopted the word from the Russian, modifying it, probably, to suit their own idiom. The Thlinket themselves state that the term was adopted from the Russians. It is only too probable, therefore, that the word *shniaga* sprang from the Aleutian or some other native tongue of Alaska or Kamchatka. The Thlinket themselves adopt names from their principal places of residence, such as Sitkakhoan, Chilkhatkhoan, and Stakhinkhvan—that is, people of Sitka, Chilkhat, and Stakhin. Russians and other European nations with whom they have come in contact were named by them Kusskhakhoan, but to the Americans, with whom they always carried on a clandestine traffic in firearms and powder, they applied the name of "Whashtankhoan." As the roots of these two names we easily recognize the words Cossack and Boston. The first word probably sounded at first Kussakekhoan. Among the Eskimo of the west the same word is in use as Kossage and Koshage.

The Thlinket tribe is divided into two branches or clans, the Raven and the Wolf family, respectively. Their myths or traditions speak of two heroes or gods who at the beginning of time, through deeds of valor and supernatural power, procured for mankind the advantages and comforts they now enjoy, and to these heroes the Thlinket think they trace their origin. The names of these beings or demigods were Yeshl or Yehl, the ancestor of the Raven clan, and Khenookh, the ancestor of the Wolf family. In spite of this theory of their origin, the raven and the wolf, considered as animals, do not take an important place in the Thlinket mythology. In discussing the mythology or beliefs of the Thlinket we shall find that Yeshl (or Yehl) during his frequent transformations occasionally adopted the form of the raven, and in this way the name of the god may have come to be applied to the bird. It may have been the same with Khenookh, though the traditions make no mention of his appearance in the form of a wolf.

Both the Raven and the Wolf clans have many subordinate divisions. Thus in the Raven

clan we hear of the Raven, the Frog, the Goose, the Sea Lion, the Owl, the Thlukhu (a species of salmon), and in the Wolf clan the family of the Wolf, the Bear, the Eagle, the Porpoise, the Shark, etc.; and each of these subfamilies is again divided into branches in accordance with the locality occupied by it.

The Raven clan, which claims to have sprung from Yeshl, the benefactor of mankind, enjoy perhaps the greatest respect, but the Wolf clan has acquired renown through its greater courage, large numbers, and successful warlike expeditions and heroic deeds.

The most renowned of the subdivisions of the Wolf clan is the Khawakhashthan or Kokhanthan, living on the Chilkhat River, which formerly held but little intercourse with other clans and maintained a reputation for courage and ferocity. Each clan or family displays in every possible way the totem or coat of arms in the shape of some easily recognized part of the animal or bird that has given the name to their division. We find such representations carved or painted upon canoes, utensils, blankets, shields, wooden helmets, and even on their horses; and on solemn occasions, during dances and feasts in memory of the dead, cremations, or other funeral ceremonies, we frequently find individuals dressed up altogether in the form of the totem of the clan.

Without reference to clan or subdivision all the Thlinket are divided into two classes, one containing the chiefs or the nobility, the other the common people. The chieftainship is hereditary in the families, but the authority connected therewith is entirely dependent upon wealth, which until of late consisted chiefly in the possession of slaves. The latter, if they belonged to the Thlinket tribe, formed a third class, as the children of a slave always remained slaves, but the majority of this class were originally prisoners, acquired by purchase or by war from other tribes to the southward, in the British Possessions.

Veniaminof's opinion of the division of the Thlinket clans was that at the beginning only two families existed, the oldest and most prominent members of which were Yeshl and Khenookh. Their children adopted the names of various animals, and still live together, though in separate houses. Each house was described by name in accordance with its position (on a hill, or on the shore of a river or lake); but when in course of time the descendants increased in number they were obliged to seek other dwelling places, carrying with them, however, the name of the abandoned locality and the proud title of a "son of Yeshl" or a "son of Khenookh." These names have descended to modern times, while the progenitors, whose memory is carefully preserved, were finally worshiped as god-like beings to whom the Thlinket owe all they possess of earthly happiness.

The traditions of the Thlinket unite in the theory of their common origin in the interior of the American continent, whence they migrated northward and westward until they emerged upon the coast of the Pacific in the vicinity of Queen Charlotte Island. An apparent similarity between the languages of the Apache and Aztec tribes and that of the Thlinket, and perhaps also of the Athabaskan tribes of the north, has been hinted at by many ethnologists and explorers since the days of Wrangell, who first called attention to the circumstance.

The outward characteristics of the Thlinket tribe may be enumerated as follows: The coarse, stiff, coal-black hair, dark eyebrows, but faintly delineated over the large black eyes full of expression, protruding cheek bones, thick, full lips (the under lips of the women disfigured by the custom of inserting round or oval pieces of wood or bone), and the septum of the men pierced for the purpose of inserting ornaments; beautiful white teeth, ears pierced not only in the lobes, but all around the rim. To these may be added the dark color of the skin, a medium stature, and a proud, erect bearing (this only applies to the men). The hands of the women are very small, and large feet are rarely met with.

Before their acquaintance with the Russians the only clothing of the Thlinket consisted of skins sewed together, which they threw around their naked bodies without regard to custom or fashion. In addition to this they wore on festive occasions blankets woven out of the fleeces of mountain goats. From time immemorial they have possessed the art of dyeing this material black and yellow by means of charcoal and a kind of moss called *sekhone*. The patterns of these

blankets wrought in colors exhibit an astonishing degree of skill and industry. The hat, plaited of roots, is also ornamented with figures and representations of animals.

By nature the Thlinket are indolent, those inhabiting the coast frequently living upon the refuse of the tide upon the beach that can be obtained without exertion. As long as they lived in their primitive state, and before the creation of artificial wants, the men of the Thlinket tribes were urged to exertion only by the rigorous climate, which compelled them to hunt fur-bearing animals and to use their skins as clothing. As their wants increased, however, they overcame their natural indolence, and now they labor faithfully and cheerfully for the sake of increasing their means of purchasing whatever takes their fancy.

The male costume is but little distinguished from that of the females, each wearing now (unless they have adopted the garments of civilization) one cotton shirt or garment reaching to the knees, a woolen blanket of various colors—white, red, green, and blue—and ornamented in front with rows of brass or pearl buttons. These blankets they wear much in the manner prevailing among the Indians of the United States and Mexico, throwing one end over the shoulder. Occasionally the garment is tightened around the waist with a gorgeous belt. As a rule, the Thlinket of both sexes go barefooted.

Both men and women paint their faces black and red with charcoal or soot and vermilion (cinnabar), which are their favorite colors. They are mixed with seal oil and rubbed well into the cuticle; subsequently figures and patterns are scratched upon this surface with sticks of wood. The wealthy Thlinket paint their faces every day, while the plebeians indulge in this luxury only occasionally.

The men pierce the partition of the nose, the operation being performed in early childhood, frequently within a few weeks after birth. In the aperture thus made a silver ring is sometimes inserted large enough to cover the mouth, but the poorer individuals insert other articles, such as feathers, etc. They also pierce the lobes of the ear for the purpose of inserting sharks' teeth, shells, and other ornaments, while through the holes around the rim of the ear they draw bits of red worsted or small feathers. Veniaminof states that each hole in the ear was pierced in memory of some event or deed.

The ornamentation of the underlip of a female (now almost obsolete) marked an epoch in her life. When she came to the age of puberty the lip was pierced and a small cylindrical piece of bone or silver was inserted. As long as she remained single she wore this, but as soon as she was married a larger piece of wood or bone was pressed into the opening and annually replaced by a still larger one, the inner side being hollowed out. Old women could frequently be seen with such labrets two inches in diameter. It was of course impossible for these individuals to close their mouths, the underlip protruding, distended by the disk of wood or bone, in the most disgusting manner—the failure to close the mouth causing an incessant flow of saliva, and often offensive pus.

The Thlinket, like most of the tribes of the northwest coast of North America, may be called marine nomads, as they occupy fixed dwelling places only during the winter, roving about during the summer in search of food for the winter. They derive their principal nourishment from the sea; a few roots, weeds, and berries forming luxuries only of the summer season. The sea that washes the shore is extraordinarily rich, not only in fish, but in all kinds of mollusks and algæ. The ebb tide bares the shore twice each day and leaves behind an abundance of such food in pools and on the rocks, enabling a Thlinket to pick up his dinner without much exertion. He refuses no kind of mollusk and consumes nearly every species of marine plant. His favorite articles of food are clams and mussels (*cardium* and *mytilus*), *echinus*, cuttlefish, the roe of herrings, and all kinds of fish; the herring's spawn is collected together with algæ, upon which it has been deposited, and preserved in boxes for the winter. This delicacy is not considered fit for the table until it has gone through a process of fermentation. Oil is pressed out of this preserved spawn of a higher and "finer" flavor than that of seal oil. Of the cuttlefish only the arms are eaten, and these are boiled until the slimy particles coagulate. In contradistinction from the Eskimo the Thlinket do not eat their fish raw; the cooking is now done in iron kettles, but in

former times they used for this purpose water-tight baskets into which heated stones were thrown. The fish intended to be kept for the winter is not dried in the sun, as is done by the Eskimo, but suspended in the smoke of the house.

The larger marine animals, such as the seal, otter, and porpoise, are much hunted and furnish abundant food to the Thlinket, but the meat of the whale is held to be unclean, being despised by all the Thlinket as pork is by the Jews, with the exception of the Yakutats living in the vicinity of Mount St. Elias. This change in habits may have been caused by the vicinity of the Yakutats to Eskimo tribes, a supposition which is strengthened by the fact that the Yakutat females do not wear the horrible ornament in the underlip.

The Thlinket dwelling within the boundaries of Alaska live in fixed settlements, but in the summer they leave their villages and roam about at will, erecting temporary shelters with poles and bark wherever they remain for a time. The winter house is erected with great care and is frequently built strong enough to serve as a fortification against the attacks of other tribes. The height of the Kolosh or Thlinket house is from 6 to 8 feet, and consists of a parallelogram of heavy logs; rafters joined at an angle of 45 degrees and covered with bark form a roof. The entrance consists of a small aperture, generally circular, but occasionally square in shape, at some distance from the ground. Each of these apertures can be closed from within by a ponderous door. In the center of the roof there is a large square opening which affords an entrance to daylight and an exit for the smoke. A screen of planks is always placed on the weather side of this opening and shifted about in accordance with the wind. Immediately under the opening in the roof is a large fireplace sunk a little into the ground. The floors in the houses of the wealthy consist of plank, but commonly of the bare soil. On two sides of the interior of this edifice are partitions for storage of provisions and utensils, while in the background opposite the entrance there is a number of small box-like partitions serving as sleeping and reception rooms for individual members of the family. These latter apartments are not high enough to permit the inmate to stand erect, and rarely large enough to allow him to stretch out.

The Thlinket display the greatest skill in the manufacture of their canoes, each being carved out of a single log. The war canoes differ from those in common use only in size, the former being intended to carry from 40 to 50 people, while the latter do not hold more than 10 or 12. The shape is substantially the same, and all are ornamented in bow and stern with gaily colored figures and carvings, the war canoes frequently bearing the totem of the owner. The handles of paddles or oars are also similarly ornamented.

Long before the first meeting of the Thlinket with the Europeans, and consequently before they became acquainted with the use of iron, they possessed the art of forging copper, which they obtained from the inhabitants of the Copper River region. A tradition exists to the effect that an old woman of Chilkhat invented the art of forging, and that she was worshiped in consequence as a benefactress of her kind. For long years this art was a hereditary secret with certain families. Daggers and spears are now manufactured chiefly of iron. The dagger is very broad and has two blades, one on each side of the handle, the upper one generally much shorter than the lower, and the handle is wound with leather thongs and provided with a long strap which is tied around the neck during combats to prevent the dropping of the weapon. Both blades have leather sheaths, also fastened to the person. This dagger is the inseperable companion of the Thlinket; wherever they go they carry it concealed under the blanket; in the market of Sitka, where they dispose of game and fish, they are seldom seen without it. The iron-pointed spear was used only in war and has been almost entirely superseded by firearms.

The greatest ingenuity is displayed by the Thlinket in their carvings in wood, bone, and slate, but chiefly in the manufacture of tobacco pipes, cups, etc. This work is now done altogether with implements of steel.

In the modes of hunting a great change has naturally taken place since the introduction of firearms, and the sea-otter, formerly in the greatest abundance, is now almost extinct. Superstition interferes with an active pursuit of marine birds, as it is generally believed that the killing of the albatross and several other species causes bad weather. The bear was formerly rarely hunted by the superstitious Thlinket, who had been told by the shamans that it is a man who has assumed

the shape of an animal. They have a tradition to the effect that this secret of nature first became known through the daughter of a chief who came in contact with a man transformed into a bear. The woman in question went into the woods to gather berries and incautiously spoke in terms of ridicule of the bear, whose traces she observed in the path. In punishment for her levity she was decoyed into the bear's lair and there compelled to marry him and assume the form of a bear. After her husband and her ursine child had been killed by her Thlinket brethren she returned to her home in her former shape and narrated her adventures. Ever since that time women, on observing tracks of a bear, at once begin to speak of him in terms of greatest praise, and continue in this strain until they are "out of the woods."

Of greater importance than the chase, perhaps, is the fishery of the Thlinket. The herring catch is conducted in the following manner: A pole about 10 feet in length is armed with iron points or nails at one end, at intervals of an inch from each other; the Thlinket fisherman propels his canoe into the midst of a school of herrings and beats the water with his pole, bringing forth a herring transfixed by each iron point at nearly every stroke. The canoe is speedily filled in this manner. The halibut is caught in very deep water with wooden hooks pointed with iron or bone, the line consisting of kelp. A small fish named ssakh (the eulachan or candle fish), the oil of which is very highly prized by the Thlinket, is caught in baskets. A Thlinket chief, when asked whether these baskets were their own invention or introduced from abroad, related the following story:

A long time ago there lived on Thlamshashakhian (Cross Sound) a Thlinket named Khakhekhuthe, who with three companions undertook a long voyage in his canoe. They could not make a landing at night, and laid themselves down in the bottom of the canoe to rest. Khakhekhuthe lay with a paddle under his head, and dreamed that various birds were flying about him, screaming. He seized a paddle and struck about, and at every stroke a bird fell. When he awoke he found his companions dead in the boat, so that he was compelled to return homeward alone. Here again a sorrowful spectacle met his eye. All his people and all the inhabitants of the place had died during his absence. Then he concluded to go in search of people at some other place. On his journey he arrived at a river, the mouth of which was full of small fish. While deliberating on the best way of securing some of these fish without hook or line he invented a basket of pliable willow twigs, and this art was transmitted to all the Thlinket he met.

This is the trivial ending of a promising tale transmitted to us by Holmberg.

The marriages of the Thlinket are without any religious ceremonies or observances, but a very strict rule exists preventing the contraction of marriage within one and the same clan; or, in other words, a Thlinket of the Raven clan must marry a wife of the Wolf clan, and vice versa. Polygamy is universal, especially among the wealthy, but the first wife always preserves a supremacy over the others. Veniaminof stated that he knew a chief on the Nass River who had 40 wives.

When a Thlinket youth has selected a maiden to his taste he sends a middleman to the parents or to the nearest relative of the woman; if the answer is favorable he sends to the future father-in-law as many presents as he can buy, borrow, or steal, and then proceeds to the spot in person. The father of the betrothed invites for a certain day all the relatives of the bridegroom, as well as his own, and when all the guests have assembled the young man advances to the center of the floor and seats himself with his back to the door; the guests then begin a song, accompanied with dances, in order to coax the bride from her hiding place in some corner of the room. After the song, which is composed only for this occasion, is finished the floor is covered with cloth, furs, and other articles of value from the hiding place of the bride to the seat of the groom, and the maiden in festive array is led over this costly pathway and seated beside her intended.

During this and all the subsequent ceremonies it is of the greatest importance that the bride shall not raise her head, but keep it in a bent position. Dances and songs follow, which are participated in by all present except the young couple, and when the dancers are tired, refreshments are served to all except the bride and groom; as in order to secure good fortune the latter are obliged to fast two days. When this period has elapsed they are furnished a small quantity of food, but this meal is followed by another fast of two days, and only after four days of fasting are they allowed to remain together, but the marriage is not considered accomplished until four weeks have elapsed. If the bridegroom is rich he gives a similar feast at his own residence, and

when the festivities come to a close he is at liberty to live with his wife's parents or at his own home. In the latter case the bride receives a dower equal in value to the presents made by the bridegroom. This marriage can be dissolved at any time by mutual consent, but in that case the presents and dower must be returned. If the man is dissatisfied with the woman he can send her home, returning the dower without any claim for a return of his presents, but if the woman proves unfaithful the man has the right to reclaim his presents and to send her away without her dower. In all such cases the children remain with the mother.

Veniaminof states that among the Thlinket, as well as some of the people of Kadiak, the married women are permitted to have what are call "legitimate lovers" or "assistant husbands," who are maintained by the wives and enjoy marital rights only in the absence of the original husband. At all other times they act as servants, carrying wood and water and providing food. Among the Thlinket the office of vice-husband can only be filled by a brother or a near relative of the husband.

After the death of the husband his brother or a son of his sister must marry the widow, and a neglect of this rule has frequently caused bloody wars. If no such relative of the husband is in existence the widow has a right to select another from a strange clan.

If the seducer of a wife escapes the dagger of the husband he must buy the forgiveness of the insulted man; but if the seducer is a relative of the husband he must at once assume the office of "assistant," as described above, and contribute his share to the support of the woman. The lot of the women among these savages is not to be envied; they are treated with the greatest cruelty before as well as after marriage. The special suffering imposed upon all womankind by nature is increased here a hundredfold by ancient custom and superstition. At the time of child-birth, when women more than at any other time are in need of assistance, the Thlinket females are driven out of the house and left to their fate, shunned by everybody as unclean. The child is born in the open air, no matter at what season, and only sometime after the birth is the mother allowed to enter a rude shed, erected for the purpose, where she is confined for ten days.

Holmberg relates the following:

> When I was on the point of departure from Sitka for California, at the end of December, 1850, I was detained for several days by bad weather and contrary winds, the ship being anchored directly opposite the Thlinket village. On several occasions I noticed a heartrending cry of distress from the hills back of the village, and upon inquiry I learned that these were the cries of several women about to give birth to children, and who had been driven forth from their homes. There they lay during a violent storm of rain and snow, deprived of all assistance.

A newborn child is not allowed to taste its natural food until it has vomited, and if this does not occur naturally its little stomach is pressed and squeezed until the desired effect is secured. At the age of a few weeks the babe is wrapped in furs and strapped upon a board, and is always carried about by the mother. The infants are given the breast from ten to thirty months, but they are accustomed to other food after they are a year old. The first strong nourishment given them is generally the raw blubber of marine animals, except that of the whale. As soon as the child begins to walk it is bathed daily in the sea, without regard to the season, which accounts to some extent for the robustness of the body of the Thlinket after he has once passed the tender age. On the other hand, this custom explains the decrease in numbers, as only a comparatively small percentage of the children survive the ordeal. All the men of the Thlinket tribes preserve the custom of bathing frequently in the sea both in summer and winter.

Each Thlinket has one name from his mother and another from his father. The first is applied immediately after the birth by the mother or her relatives, and is generally the name of some distinguished ancestor of the mother. The other name is taken from a deceased relative on the father's side, but this is applied only on some festive occasion or during some great memorial feast. Such Thlinket as are unable to provide a feast of this kind remain without the second name. A wealthy chief has the right to apply such a name at the time of birth of a son, but in that case the son is bound in course of time to celebrate a feast in memory of the paternal ancestor after whom he has been named. If a father possesses a son who has distinguished himself the father is named after this son, as "the father of such and such a one." Holmberg relates that among the principal chiefs of Sitka there was one whose name from the mother's

side was Shighakhu, but during a great festival he received the name of an uncle, Kukhan; he was subsequently baptized and received the Christian name of Michael. As the most powerful and distinguished among the chiefs he ought to have had a distinguished son, and thereby derived the fourth name, but as he had no son the other Thlinket, in derision, called him after one of his dogs, and spoke of him as "the father of such and such a dog."

As soon as a young girl arrives at the age of puberty she is confined in a dark shed with not room enough to move about. For a whole year she has to remain secluded here, being regarded as unworthy to enjoy the light of heaven, and during the whole time she must wear a broad-brimmed hat, so that she can not even look heavenward. Only the mother and a female slave have the right to bring food to her. It is easy to imagine the inexpressible misery this long imprisonment must cause. In the immediate vicinity of Sitka and other settlements, however, the Thlinket have reduced the period of seclusion to six, and in some instances to even three months. During the first weeks of this imprisonment the operation of piercing the underlip takes place. Female slaves are excepted from all such ceremonies and observances.

All observers and visitors at Sitka have noticed that the Thlinket women have a waddling, crooked, and sometimes even a limping gait, which seems all the more remarkable in view of the proud and erect bearing of the men. It would be a natural conclusion to ascribe this defect to this long period of imprisonment at a time when the female body is developing most rapidly; but we find the same custom to exist among Eskimo tribes, with even stricter rules, without causing a similar change in the gait and bearing of the women.

After the period of seclusion of a wealthy female Thlinket has expired the relatives provide a feast, during which the girl, richly clothed, is presented to the assembled guests, who have been feasted and treated to all the delicacies of the Thlinket cuisine. The female slave who assists in dressing the girl for this festivity generally receives her freedom, and the garments worn during imprisonment are destroyed.

The Thlinket consider corporal punishment as the greatest disgrace that can be inflicted upon a free man, and consequently they do not, as a rule, make use of it. On one occasion, however, it may be employed: When a boy refuses to bathe in cold water he is compelled by beating with a stick to do so, but this is looked upon not as a punishment, but as a means of hardening the body. Theft is in their opinion not much of a crime, and if a thief is caught he is only required to return the stolen article or pay its value. For murder the law is "blood demands blood."

The wars of the Thlinket, now of rare occurrence, were either general or private in character. The general wars were conducted with great cruelty by means of ambush or surprise, and the captives were made slaves. Early English and American visitors to the Thlinket coast reported the existence of the practice of scalping, and that scalps were used on festive occasions to ornament the legs of the dancers. It is impossible to ascertain whether the Thlinket ever were cannibals, and nothing has been stated on this point by early explorers. Only the English Captain Meares, who sojourned for some time at Nootka Sound, states that the natives there, who are closely related to the Thlinket family, acknowledged to cannibal practices.

When a Thlinket warrior prepared himself for a war he painted his face red and powdered his hair with the white down of the eagle. The last-mentioned decoration is always an indication of great solemnity in the undertaking.

The private wars consisted only of quarrels between subordinate clans or families, and occasionally such disputes were settled by a single combat In this case each party to the contest chose one fighting man from their midst, the two families or clans were drawn up in order of battle, while the two combatants, provided with thick armor made of moose or bearskin, and with wooden helmets, carved in the shape of the family totem, protecting the head. The only weapon used on such occasions was the dagger, and the contest was accompanied with dancing and singing on both sides. When peace was made an exchange of hostages took place, and it was the custom for the latter to eat for several days only with the left hand, the right having borne arms too recently. To each hostage two companions from the opposite side were assigned to watch him, and these companions had to be of equal rank with the hostage.

The Thlinket burn their dead upon funeral pyres, with the exception of the bodies of

shamans or sorcerers, which are deposited in boxes elevated on posts. The dead slave is not considered worthy of any ceremony whatever; his corpse is thrown into the sea like the carcass of a dog. When a Thlinket dies his relatives prepare a great feast, inviting a multitude of guests, especially if the deceased has been a chief or a wealthy and prominent member of a clan. The guests are chosen only from a strange clan; for instance, if the deceased belonged to the Raven clan the guests must be from the Wolf clan, and vice versa. No certain time is set for the cremation or for the festivities; this depends altogether upon the magnitude of the preparations, and it frequently occurs that the corpse is in an advanced stage of putrefaction when the time arrives. Poor people who are unable to defray the cost of such ceremonies take their dead to some distant cove or bay and burn them without any display. When the guests have assembled and the pyre has been erected the corpse is carried out of the village by invited guests and placed upon the fagots. The pyre is then ignited in presence of the relatives, but these latter take no active part, confining themselves to crying, weeping, and howling. On such occasions many burn their hair, placing the head in the flames; others cut the hair short and smear the face with the ashes of the deceased. The Thlinket of Prince of Wales Island boast of torturing themselves in the most reckless manner at the time of cremation, slashing and tearing their arms with knives and beating and bruising the face with sharp rocks. When the cremation of the body has been accomplished the guests return to the dwelling of the deceased and set themselves with the widow, who belongs to their clan, around the walls of the hut; the relatives of the deceased then appear with hair burned and cropped, faces blackened and disfigured, and place themselves within the circle of guests, sadly leaning upon sticks with bowed heads, and then begin their funeral dirges with weeping and howling. The guests take up the song when the relatives are exhausted, and thus the howling is kept up for four nights in succession, with only a brief interruption for refreshment. During this period of mourning, if the deceased had been a chief, or wealthy, the relatives formerly killed one or two slaves, according to the rank of the dead, in order to give him service in the other world. This is the only indication of the existence of a belief in a future life by the Thlinket. At the end of the period of mourning, or on the fourth day following the cremation, the relatives wash their blackened faces and paint them with gay colors, at the same time making presents to all the guests, chiefly to those who assisted in burning the corpse. Then the guests are feasted again, and the ceremony is at an end. The heir of the deceased is his sister's son, or, if he have no such relative, a younger brother. I have already mentioned that the heir was compelled to marry the widow.

The festivities of the Thlinket consist almost exclusively of singing, dancing, gorging, and a distribution of presents. The dance consists of very rapid motion and passionate action, according to the wording of a song or the significance of the feast. All the festivities I have thus far mentioned belong, with the exception of cremation, to the occasion of minor importance; of the same class are the festivities on the occasion of moving from one dwelling place to another, which form a parallel to the house-warming of civilization; so also are the sorceries or incantations. This subject, however, will be more properly discussed with the religious views of the Thlinket. It sometimes occurs that dancing and singing are carried on without any apparent motive, and on such occasions imitations of the actions during the greater festivities are given, apparently with the object of keeping them fresh in the memory of the people by repetition.

The festivity in memory of a deceased relative is by far the most important celebrated among the Thlinket. They call it "to glorify the dead," and frequently monuments are erected during such occasions, not so much in honor of the deceased as in memory of the feast and its giver. However, as only the wealthy are able to celebrate such feasts, and the expense is exceedingly great, they are of rare occurrence. Guests are invited from many distant settlements, and all these must not only be fed, but also loaded with presents. It frequently happens that the giver of a feast thus squanders not only his whole possessions, but also the dower of his wife, the result being a life of the greatest penury for himself; but he is satisfied with the honor of having celebrated the memory of his deceased ancestor in a dignified manner.

Sometimes these festivities are confined to one family, sometimes a whole settlement is invited. Long before the period agreed upon arrives messengers are sent out near and far to

call the guest from distant clans or tribes, not by name, but simply saying that all may come who wish to do so. Frequently women and children accompany the guests. The house designated for the celebration is cleansed as much as possible, or perhaps a new house is erected for the purpose, ornamented within and without with the totems of the possessor. When the guests arrive the feast begins with dancing and singing, lasting until the following morning; then comes the grand repast, of which only the guests, who always begin the festivities, have a right to partake. For many days and nights singing and dancing are only interrupted by eating, and the whole celebration continues as long as the giver of the feast is able to feed the visitors. On the evening of the conclusion of the ceremonies the host retires to a corner of the house accompanied by a slave, and there is adorned with garments used only on such occasions and kept as heirlooms in the family. These garments vary in the different clans, and consist chiefly of parts of the animal represented by the totem of the clan. This dress formerly was ornamented with sea-otter teeth, ribbons, strips of ermine skin, etc. The slave who assists his master in dressing for this feast always receives his liberty.

As soon as the host emerges from his concealment in gorgeous array, surrounded by slaves, the whole assembly breaks out into the cry of the animal representing the family totem. (Holmberg states that in accordance with the peculiar tone or inflection of his cry one or more slaves were killed.) Upon completion of this sacrifice the relatives of the host begin the traditional songs of their clan, singing of the origin of the family and the deeds of their ancestors. Then the host seats himself on the floor, and the presents intended for distribution are deposited before him. The distribution is by no means equal, the wealthy and the most prominent individuals receiving the greater number of presents of the greatest value, often consisting of slaves, while the poor have to be satisfied with worn-out blankets or even fractions of the same. This virtually ends the festivity, but frequently a repetition of the whole affair occurs in the next house, and so on until the whole settlement has contributed to the splendor of the occasion. As has already been mentioned, the giver of such a feast has the right to adopt the name of an ancestor on his father's side.

Another festive occasion must be mentioned, which also belonged to the more important feasts, and was intended to give social standing to children. Great expense in the shape of presents was connected with this feast, but at present it is rarely observed. It is very similar to those already described, differing only in a few minor ceremonies. No slaves were killed on these occasions, but on the contrary a number of them, equal to the number of children in whose honor the feast was given, were liberated. For this occasion a new house was erected with the assistance of the invited guests as well as of the people of the clan. All who participated in the labor, without regard to family, received presents, while at all other feasts only the guests were thus remembered. After singing and dancing and the distribution of presents the children were introduced one by one and subjected to the operation of piercing the ears. As soon as the awl was introduced and the puncture made all persons present gave forth a hissing sound, probably with the intention of smothering the cries of the children. After the operation presents were again distributed and a final repast indulged in.

Before turning my attention to the religious views and myths of the Thlinket I must say a few words of the unfortunate beings who were considered by their masters as merchandise, and given away or killed at their pleasure. The slaves of the Thlinket all sprang from prisoners of war (but frequently the prisoners of one clan were purchased by members of another), or they were born of female slaves. Though under the Russian rule wars among the Thlinket tribes became of rare occurrence, the number of slaves did not diminish. The supply was kept up by barter with the more southern tribes, and at that time a majority of the slaves belonged to the Flathead Indians of the British possessions.

The slave enjoyed no civil rights whatever among the Thlinket; he could not possess property, and if he acquired anything by labor or by gift it was still the property of his master. He could not marry without his master's consent, and very rarely was he allowed to do so at all. As already mentioned, slaves were killed on festive occasions or liberated. The liberated slave was invested with the rights of the lowest grade of the Thlinket, and was counted with the clan

to which his mother belonged. This rule held good with the slaves from the British possessions, as there also the natives are divided into the Raven and the Wolf clans. Rarely an able-bodied slave was slaughtered on festive occasion, as he was looked upon as merchandise of the greatest value, difficult to replace. If an intended victim managed to escape or to conceal himself he was allowed to live, and might return after the conclusion of the festivities at the house of his master without incurring punishment. It frequently occurred that powerful chiefs assisted favorite slaves on such occasions to make their escape. The universal rule was, however, to select for the sacrifice only the old or diseased slaves who were more of a burden than profit to their masters. Of the honor of cremation after death the slave was deprived.

In the Thlinket mythology Yeshl or Yehl occupies the place of creator of all beings and things, and his power is unlimited; he created everything in the world, the earth, man, plants, etc., and assigned the sun, the moon, and the stars to their places. He loves mankind, but in times of anger he sends disease and misfortune. He existed before his birth; he does not grow old and does not die, and with the east wind the Thlinket receive tidings of his existence. His dwelling place is at the place nearest where the east wind blows (called by the Thlinket *Ssannakhe*). The Thlinket locate this place about the source of the river Nass, which enters the sea near the British boundary. This locality is still called Nass-Shakiyeshl. Yeshl has a son, but his mother and the circumstances of his birth have remained unknown. The son loves mankind still more than his father, and it frequently occurs that he intercedes with the latter in his wrath, and supplies mankind with food. That Yeshl is the origin, the ancestor of the Raven clan, has been already mentioned. The life and deeds of Yeshl form the only thing in the shape of dogma in the belief of the Thlinket, and their whole moral code is comprised in the doctrine, "As Yeshl lived and acted, so must we live and act." There was a time when the world was not and man lived in the dark; at the same time there was a Thlinket who had a wife and a sister; the former he loved so much that he would not allow her to do anything; she sat the whole long day in her cabin, or outside upon a little hill, just as the Thlinket love to do now. She had always eight little birds about her with a bright-red color, such as come up to this part of the coast from California, and are called *kun* by the Thlinket; and whenever she indulged in the most innocent conversation with any other Thlinket the birds flew away and thus informed the jealous husband. His jealousy, however, went still further; every time that he went to the woods to build canoes, in which art he was a great master, he placed his wife in a box, locking the same. His sister had several sons—it is not known by whom—but the suspicious uncle killed them all, one after the other. As soon as he noticed that the nephew was approaching manhood, and perhaps cast his eyes upon his wife, he invited him to go fishing in his canoe, and as soon as they were at a distance from the shore he upset the canoe of the nephew, and thus got rid of a possible rival. At length the mother, inconsolable over the loss of her child, walked along the shore weeping. She observed a number of large dolphins or whales passing by the shore, and one of them hastened to enter into conversation with the mourning mother. When he learned the cause of her sorrow he advised her to go into the water, pick up a small pebble from the bottom, swallow it, and then drink copiously of sea water. As soon as the whale had left she followed his counsel, and the consequence was that in eight months later she gave birth to a son whom she considered a common mortal, but it was Yeshl. Previous to his birth the mother concealed herself from her brother. When Yeshl grew up to boyhood his mother made him a bow and arrow and taught him their uses. Yeshl soon became an expert and a successful marksman, so that no bird could escape his arrow, and as proof of his great skill it is narrated that the mother had a long garment made entirely out of the skins of humming birds shot by the son. One morning when Yeshl arose he saw seated before the door of the hut a large bird with a tail as long as that of a magpie, and provided with a long strong bill with a metallic luster. This bird the Thlinket named *kutzghatushl*—that is, a crane who can reach heaven. This bird Yeshl killed and carefully removed its skin, which he put on himself, and immediately expressed not only the desire but the power to fly. He rose at once into the air and flew so far that he struck against the clouds with his bill with such force that he remained hanging, and only with difficulty succeeded in extricating himself from his disagreeable position. As soon as he had freed himself

he returned to his hut, doffed the bird's skin and concealed it. At another time he killed in a similar manner a gigantic duck and thereby procured for his mother the power to both swim and fly.

When Yeshl had grown up to manhood he heard from his mother of the crimes of his uncle and the sad fate of his brethren. He set out at once to revenge himself and soon reached the dwelling of his uncle, who was absent in the forest working. He opened at once the box in which his uncle's wife was confined, and the birds flew away. The uncle returned homeward in a great rage, but Yeshl sat calmly without stirring from his place. The uncle then called him out of the hut, led him into a canoe, and paddled out to sea to a spot where a number of marine monsters were sporting about. Here he threw him into the water, believing that he was rid of another enemy; but Yeshl walked along the bottom of the sea to the beach and rejoined his uncle. Seeing that he could not destroy his nephew by any common means, he ordained in his wrath that a flood should arise, and the ocean began to rise higher and higher, but Yeshl again crawled into his bird skin and flew away to the clouds, hanging there with his bill until the flood had covered all the mountains, just touched his wings, and then subsided. Then he let go his hold, fell into the sea upon a bunch of kelp, and a sea-otter carried him thence to the shore.

The Stakhin Thlinket tell the story somewhat differently. They say that Yeshl after his aerial flight fell down upon Queen Charlotte Island, and, picking up pieces of the wood of the Douglas pine (called by the Thlinket *shlakh*, by the Russians *chaga*, of which the best canoes are made) in his bill, he flew all over the other islands, and wherever he let fall a piece of this wood, there this tree, which is highly prized by the Thlinket, grows now. It seems that he did not reach the island of Sitka, as this species of pine does not exist on the island.

From this period began all his journeys through the world, which are so rich in adventure that the Thlinket say one man can not know them all. Once he recalled to life some dead boys by tickling their noses with hair; at another time he obtained the fish ssakh, by inciting a fight between a gull and a heron; but the most remarkable of his deeds was the creation of daylight on the earth. Up to this time the sun, moon, and stars were not yet placed in the heavens, but were concealed in three separate boxes by a rich and powerful chief, who guarded his treasures so well that nobody could touch them. When Yeshl heard of this he expressed a desire to obtain them, and how he succeeded is described in the following narrative:

The chief just mentioned had an only daughter whom he loved and pampered so much that she was not allowed to eat or drink until the father had examined the food or drink. Yeshl, aware of these circumstances, understood that it would be possible only to the grandson of the chief to obtain the light, and therefore he resolved to be born again by his daughter. This apparently difficult task was an easy one to Yeshl, who could assume any form he liked. Consequently he transformed himself into a blade of grass and leaned against the vessel out of which the chief's daughter was in the habit of drinking, and when, after due examination by the father, she lifted up the bowl to quench her thirst, Yeshl, disguised in the blade of grass, wriggled into her throat and was swallowed. The result was that in due time the chief's daughter was about to give birth to a child and her father spread a number of sea-otter skins on the floor to afford a soft couch, but all the efforts and assistance of servants did not seem to help in her labor. At last a very old woman led her out in the forest, and as soon as she had stretched herself on a couch of moss the birth took place. The grandfather was very much rejoiced over the birth of his grandson and loved him almost more than his own body. At one time Yeshl began to cry and would allow nobody to quiet him. No matter what they gave him—whatever was given to him he threw away and cried all the more, always pointing with his hand to where the boxes containing the heavenly lights were suspended. To give him these it was necessary to have the consent of the grandfather; however, as there seemed to be no end to his crying the old man gave him one of the boxes. Yeshl at once ceased his clamor and commenced to play with the box in great glee; gradually he dragged the box out of the house, and noticing that he was not very closely observed, opened the lid, and at once the stars were in the heavens and the box was empty. The sorrow of the old man over the loss of his treasures was inexpressible, but he never denied his beloved grandson. Yeshl soon after employed a similar ruse to obtain the second box, which contained the moon. At last he invaded the last box, the most valuable of all, in which the sun was hidden, but the old ruse would no longer serve his purpose. The grandfather remained inexorable. Then Yeshl began to cry and weep so hard that he could not eat or drink, and became seriously ill. At that the grandfather's pity was aroused and he gave him the box with the strictest injunction that the lid must not be raised, but as soon as Yeshl had the box outside he transformed himself into a raven and flew away with the box. On his way he heard human voices, but could not see the people because no light as yet illuminated the earth. He questioned the people whether they desired to have light. They answered: "You will only cheat us—you are not Yeshl, who alone can give us light." In order to convince the doubters Yeshl raised the lid of the box and at once

the sun shone from the heavens in all its splendor. The men ran away, frightened, in all directions; some of them into the mountains, some into the woods, and some into the water, and all of these were transformed into animals according to their hiding places.

The Thlinket were still without fire; those who had it were located upon an island far out at sea. Yeshl proceeded to this spot with the help of his bird skin, picked up a burning brand in his bill and hurried back, but the journey was so long that nearly all the wood burned up, and even the point of his bill was scorched. As soon as he arrived on the shore he let fall upon the earth the glowing coal that still remained, and the sparks were scattered over both wood and pebbles. From this time the Thlinket say both wood and stone contain fire, which can be obtained from the one by concussion and by friction from the other.

Fresh water was also not to be found on the islands and continent inhabited by the Thlinket, but on a small island a little to the eastward of Sitka there was a well guarded forever by a watchman named Khenookh, the original ancestor of the Wolf clan. Yeshl again employed artifice in obtaining the boon of fresh water. He took as much as he could into his bill and then flew away to the islands and remained, letting fall here and there drops of the precious fluid. Wherever the little drops fell there are now rivulets and streams, and where the large drops fell, lakes and good large rivers were formed. The ruse employed by Yeshl in stealing the water from Khenookh forms the subject of a separate tradition.

Khenookh is, in the mythology of the Thlinket, a mysterious person without beginning or end, wealthy and more powerful than Yeshl; he plays a prominent part in this water myth. He was a man as well as Yeshl, and inhabited the island above-mentioned. Even now the Thlinket say that a square stone-capped well with a stone cover exists on the spot. In the interior of the well they point out a narrow colored or striped line, which they say was not there from the beginning, but only since Yeshl stole the water. The water of the well is said still to possess some curious qualities; if an unclean being washes his hands therein the water disappears from the well and rises on the seashore. The whole neighborhood is still called Khenookh-keen—that is, Khenookh's water—because at the time when Yeshl, for the benefit of mankind, undertook his enterprise Khenookh guarded the well so strictly that he built his house over it and slept on the cover of the well. At one time Khenookh was paddling over the sea with his canoe, and meeting Yeshl also in a canoe he asked him, "How long have you lived in the world?" Yeshl replied that he was born before the earth was in its place. "But how long have you lived in the world?" asked Yeshl in his turn. "Since the time," replied Khenookh, "when the river emerged from the beach." Replied Yeshl, "Then you are older than I am." Thus boasting against each other they gradually left the shore point, and Khenookh, desiring to display his strength and power before Yeshl, took off his hat and at once there came up a dense fog. Profiting by this Khenookh turned away from his companion, out of his sight. Yeshl became alarmed and began to call Khenookh by name, but he kept silent and concealed by the fog. When Yeshl saw that he could do nothing in this terrible fog he began at last to cry and to shout. Then Khenookh came to him and said: "What are you crying about?" and with these words he replaced his hat upon his head and the fog at once disappeared. By this action he caused Yeshl to exclaim, "You are more powerful than I am." Then Khenookh invited Yeshl to his dwelling, and upon arriving there Yeshl was treated to fresh water. This pleased him so much that he could not get enough. After the repast, Yeshl began to relate his deeds and adventures, and though his tales were exceedingly interesting, and though Khenookh listened at first with the greatest attention, he finally sank into a profound sleep, unfortunately still stretched upon the cover of the well. Then Yeshl had to invent another ruse. He stole out of the hut, killed a dog, and smeared the sleeping Khenookh with the blood. Then he shouted to the sleeper and said, "Arise, Khenookh, and look upon yourself, you have been bleeding from the nose." Khenookh awoke suddenly, half dazed, and rushed out of the house into the sea to cleanse himself. Then Yeshl hastened to the well, lifted the cover, and drank his fill. After filling his stomach he took as much as he could into his mouth, transformed himself into a raven, and tried to escape from the cabin through the smoke hole, but his wings caught on something and the returning Khenookh at once recognized his guest in the struggling raven. He made a fire and began to smoke Keshl.

(The Thlinket think that the raven only turned black on this occasion, having been white before.) At last Khenookh grew tired, and Yeshl escaped along the water to drop upon the earth as heretofore described.

As soon as Yeshl had done everything for the welfare of the Thlinket he proceeded eastward to his home, the Nass-Shakiyeshl, which was inaccessible not only to human beings but also to spirits. It is said that in modern times a spirit attempted to reach the locality and was punished for his presumption by having his left side turned to stone. The mask of this same spirit, which was in the possession of the famous Chilkhat shaman, was miraculously affected at the same time, one side of the mask, which was originally of wood, being petrified. Yeshl in his capacity of God also bears the name of Hashakhoon, a name which has been applied to the God of the Christians (the common expression for the latter term is *Mokh*, a corruption of the Russian *Bogue*). The Thlinket have a very great number of subordinate gods or spirits, called by them *yekh* (in plural *yakh'h*), whom the shamans or sorcerers (*ikhth*) invoke during their performances. Every sorcerer, and they are very numerous, has his special spirits who are at his command, in addition to a large number of others upon whose assistance he can count only on special occasions. These spirits are divided into *khiyekh* or *khinayekh*—that is, the superior spirits—and into *takhiyekh* (land spirits who live in the north) and *tekiyekh* (water spirits). The khiyekh are the spirits of the braves who had fallen in battle. They live in disguise and reveal themselves in the aurora; consequently a strong northern light is considered by many Thlinket a prophecy of war. The takhiyekh are the spirits of those who had died a natural death, and their home is called Takhankhoo. The road to this place is not the same for all. Those over whose death the relatives cry or howl but little is smooth and even, but those who receive their whole measure of noisy mourning must walk over a swampy, wet road. The takhiyekh appear to the sorcerers in the shape of land animals, the tekiyekh in the shape of marine animals or fishes. In regard to the origin of the latter the Thlinket do not all agree. Some maintain that they are the spirits of the animals themselves. In addition to these each Thlinket has his own yekh, who attends him as his guardian spirit. When a man becomes wickedly inclined his yekh leaves him and sometimes kills him. The spirits seem to like cleanliness, as a rule, and they allow themselves to be conjured only with the sound of a drum, or another instrument which we have not yet described. This consists of a hollow wooden bird filled with small pebbles, so that every movement of the bird creates a rattling noise. This is used in all dances and songs.

The Thlinket believe in the immortality and migration of souls. The soul does not migrate into bodies of animals, but into other human beings, chiefly into relatives of the female line. For instance, if a woman before giving birth to a child sees in a dream a deceased relative, it is said that the latter's soul has gone into her; or if the new-born child resembles in any way the deceased, it is taken for granted that he has returned to earth and the child at once receives his name. A Thlinket who envies a rich or noble family may be heard to say: "When I die I should like to be born again in this family;" others exclaim, "O that I might be slain speedily, so that I might be born again in this world under better circumstances." The souls of those who are cremated are wholesome and comfortable in the other world, others suffer with cold, but the souls of those in whose honor slaves have been sacrificed will never need to wait upon themselves.

The traditions of the Thlinket also speak of a general flood, during which the people saved themselves in a huge flat edifice; when the water receded this craft stranded upon a submerged log and broke in two, when the water receded still more. From this it is said comes the difference in languages, as the people in one-half of the broken vessel remained Thlinket, while those of the other half were changed into all the nations of the earth.

At the beginning of this flood a brother and sister were separated; the brother's name was Khethl—that is, "thunder and lightning;" the sister's name was Aghishanookhu—that is, "wife under the ground." In taking leave Khethl said to his sister, "You will never more see me as long as I live;" then he donned the skin of a gigantic bird and flew away to the part of the world which we call southwest. The sister, after the separation, ascended Mount Edgecombe, in the vicinity of Sitka; the mountain opened its summit and swallowed her. From this time dates the great hole at the summit of the mountain (the extinguished crater). Khethl kept his promise to

his sister and comes annually to Sitka; the thunder is the noise of his wings and the lightning is the flash of his eyes. His favorite food consists of whales. The continuance of the sister's life in the interior of the mountain points to the origin of its volcanic nature. In the opinion of the Thlinket the earth, forming a disk, rests upon the point of a pillar nicely poised. This pillar is held in the hand of the humane Aghishanookhu, who guards and watches it in order that the earth may not fall and be submerged in the water; but at times, when the gods hating mankind battle with her for the purpose of obtaining possession of the pillar in order to destroy the inhabitants of the earth, the earth trembles; but Aghishanookhu is strong enough to defend her children.

From another source Holmberg obtained a variation of this myth concerning Mount Edgecombe. "No," he said, "I have never heard that animals came out of Edgecombe, but in a great hole at its summit there lives the bird *khunnakhateth* [probably the name of the bird into which Khethl was changed], who, after seizing with each talon the whale, rises into the skies, producing thunder with the beating of his wings and lightning with the blinking of his eyes.

Having thus discussed the myths of the Thlinket, representing as they do the different dogmas and historic traditions, as in a poetic dream interwoven with the darkness of fable, I now turn to the not less important subject of "shamanism," closely related to the former.

Sorcery or shamanism played an important rôle in the ancient history of all northern nations. Shamanism has existed among all of them though in various forms and degrees, but their nature and character are always the same. We find in every nation of the world more or less superstition—that is, an inclination to explain by supernatural agency all that the mind is unable to grasp—but the particular kind of sorcery or shamanism referred to here belongs exclusively to the north. To explain the cause of this perhaps requires a very profound and searching insight into the physical and psychological condition of mankind in various climates, or perhaps it lies concealed in the magic darkness that envelops the sharply defined characteristics peculiar to polar regions. It appears that both shamanism and magnetism have their center near the pole, and both are in their inmost nature unknown and mysterious. We can observe only their effects manifested as phenomena.

The words and actions of the shamans and sorcerers are considered as infallible by the Thlinket, who believe in them sincerely. Some shamans, it is not known why, prohibited the consumption of whale meat, which is considered a great delicacy by all other coast tribes of northwest America. In order to be a shaman it is necessary not only to possess the power to have various spirits at one's disposal, but also to call them whenever the emergency arises. On these occasions the shaman twists, throws, and paints his body in the most unnatural manner. The object of such sorcery is not only to reveal the future, but to ascertain all that is hidden, and with the help of spirits to prevent or avoid misfortune and disaster. Shamanism is generally hereditary in families—that is, it is transmitted with all its mysteries and collections of apparatus, such as masks, drums, straps, etc., to the son or grandson of the shaman. However, the descendants of a shaman are not always able to follow in his footsteps, not possessing, perhaps, the power to call the spirits and to enter into communication with them.

A man who intends to prepare himself to become a shaman proceeds for a time into the woods, or to the top of a mountain, where he may remain undisturbed by visitors. Here he passes from two to four weeks, feeding only upon the roots of *Pamax horridum* (called by the Russians *nezamainik*). The length of time depends upon the willingness of the spirits to appear. As soon as they come the most prominent among them sends a land otter, in whose tongue the secret and power of shamanism are believed to be hidden, to meet the aspirant. On sighting each other they both stop, and the man kills the animal, exclaiming four times, "Oh!" in various keys. The otter then falls upon its back, the tongue protruding. This the shaman cuts off and preserves in a diminutive basket brought for the purpose. This talisman he conceals carefully from everybody. If it should happen that an unwashed being obtained this secret charm he would lose his reason at once. The skin of the otter is taken off and kept by the shaman as a sign of his profession, and the meat is buried in the ground. Owing to this tradition no Thlinket dared

to kill a land otter previous to the arrival of the Russians at Sitka, but of late years experience and avarice have overcome the superstition in this respect.

If the shaman, after a long seclusion, does not find himself able to summon spirits, he proceeds, still fasting, to the grave of a deceased shaman, passing the night with the corpse and taking one or two of its teeth into his mouth. If this last effort prove successful, the shaman returns to his people half starved and much reduced in body, and as soon as he arrives his power and skill in sorcery are tested. The honor and power of a shaman depend upon the number of his spirits, and whose influence he caused to contribute to his wealth. Each shaman has his own spirit, and a certain name and certain song for each of them. On many occasions he meets with the spirits of his ancestors, which increases his power to such an extent that he is enabled to throw his spirits into other beings who refuse to believe in his powers. The unfortunates to whom this happens faint away and suffer terrible cramps or faint ever after. If a shaman becomes ill his relatives fast for many days in order to help him. His apparatus is kept in separate boxes, and for each spirit he has a peculiar wooden mask. The hair of the shaman is never cut.

As has already been remarked, the shaman is not cremated after death, but set by in an elevated box. During the first night the body is allowed to remain in the corner where the death occurred, but on the following day it is removed to another corner, and this is continued for four days, until the corpse has rested in every corner of the house. During this time all the inmates of the house must fast until on the fifth day. Dressed in the full traditional costume, he is lashed upon a board, in the sides of which holes are pierced. Two bone sticks that were used by the shaman during his incantations are placed one through the hair and the other through the orifice in the partition of the nose; then the head is covered with a basket made of twigs, and the corpse is carried to the place of burial, which is always located on the shore. Whenever a Thlinket passes the grave of a shaman he throws down some tobacco into the water (formerly, of course, it was some other article of value), in order to earn with this sacrifice the favor and good will of the deceased.

The shaman's incantation is generally conducted as follows: On the day set for the purpose the relatives of the shaman who assist him, especially the singers, are not allowed to partake of food, and are obliged in addition to empty their stomachs, which they do by drinking tepid water and tickling the palate with a feather. The celebration begins with sunset and continues until the following dawn. All the Thlinket who wish to participate in the ceremony, men as well as women, assemble in the house of the shaman, which has been cleaned as much as possible, and begin their singing to the time of a drum. After the shaman has donned his professional apparel and covered his face with a mask he begins to run around the fire burning in the center of the house, twisting and moving his face with violent contortions to the beating of the drum, and until his eyes, which during all this run are always directed to the ceiling, are almost turned in his head; suddenly he stands still, looks upon the upper side of the drum, and utters a loud cry; the song ceases, and all eyes are bent upon him. In these ceremonies consist the whole art of the sorcerer. During the performances the spirits pass in review before him, appearing in various forms. Upon the appearance of each successive spirit the shaman changes his mask—that is, he dons the mask of the spirit with whom he communicates for the moment. Any words he utters during this ceremony are considered as inspirations of the spirit. At the conclusion of the ceremony the assembly is first treated to tobacco and then provided with food. These incantations only take place in the winter, at the time of the new and full moon; and are undertaken chiefly for the purpose of preserving the good will of the spirits toward the inhabitants of the settlement—to obtain their assistance perhaps in allaying an epidemic disease and transporting it into some hostile settlement. In addition to these grand occasions incantations are indulged in from time to time for the purpose of ascertaining the cause of sickness or misfortune, etc. The cure of diseases, however, does not depend so much upon the shaman as upon certain other individuals, who are called by the Thlinket *nakuzati* (derived from the word *naku*, which signifies medicine; the term might be translated physician or medicine man), and in whose power it lies to injure or destroy other people.

The Thlinket name for—
Russian people, is Kuskekhan (Cossack).
Kadiak people, Kaiakwan.
Chugach people, Kushek.
Kenai people, Tisnakwan.
Aleut people, Tiakhakwan.
Yakutat people, Tliakhaikh-kwan.

Sir James Douglas, governor of the Hudson Bay Company's domain in British Columbia, wrote as follows:

The most enlightened of the Thlinket tribes entertain rational ideas concerning their deities, while others invest them with irreconcilable qualities, such as boundless power, with an extreme simplicity that the most stupid can puzzle and deceive. Probably they have no clear and well-defined ideas on these abstruse points, which are not of a nature to attract their attention, and they merely repeat the tradition as it was received from their fathers, without scrutiny or comment of their own. The Thlinket believe in the existence of a Supreme Being, whose name is Yealth, and that he has a son named Yealth Yay—i. e., the Son of God. They also think that there is a malevolent being called Kosstahooshtekakah. Yealth wears the human form; he made the earth; then man was formed. A faint light afterward appeared, gradually growing in brightness until the stars were seen. Then the moon was made, and lastly the sun shone forth in all his glory. They think that all men are not descended from the same parent stock, but that Yealth traveled from country to country and made a new man in each, to whom he gave a new language, not through the exertion of miraculous power, but by the mere physical process of changing the position of the internal organs by giving them a good sound twist with his hand. When all things were finished he commanded man to do good and to commit no wickedness, while at the same time he urged them to retaliate for hostile attacks of other people, and return injury for injury. He added: "I am now going away, but my eye will be always upon you. If you live wicked lives you can not come to me, as the good and brave only can live in my place." With these words he left the earth and has not since that time returned to it, and they do not know where he is at present. The Thlinket think that there is a future state of retributive rewards and punishments. After death the souls of men ascend through successive stages, rising one over another like the stories of a house, to the highest heaven, where they find a strong gate guarded by a giant who knows the name of every spirit that makes its appearance there. After proclaiming the name aloud he proceeds to question the spirit regarding its past life, and closes the examination either by receiving it into heaven or driving it back to the inferior stages, where it wanders about comfortless amid yawning gulfs opening before it at every step. The knowledge of these things has no perceptible effect on their conduct. They steal and cheat and lie whenever they feel an interest in doing so, without any visible apprehension of incurring Yealth's displeasure. They all admit that theft, falsehood, and roguery are criminal, but nevertheless have recourse to them without hesitation whenever it suits their purpose.

Polygamy is a general practice among them, and they keenly resent any unsanctioned misconduct of their wives, although they do not scruple to sell their favors for a small consideration. If unmarried women prove frail the partner of their guilt, if discovered, is bound to make reparation to the parents, soothing their wounded honor with handsome presents. A failure to do this would cause the friends of the offending fair one to use force to back their demands and to revenge the insult. It must not, however, be supposed that they would be induced to act this part from any sense of reflected shame, or from a desire of discouraging vice by making a severe example of the vicious; or that the girl herself has any visitings of remorse; or that the parents think her a bit the worse for the accident, or her character in any way blemished. Such are not their feelings, for the offender is simply regarded as a robber, who has committed depredation on their merchandise, their only anxiety being to make the damages exacted as heavy as possible.

Mr. A. Krause, an explorer connected with the Geographical Society of Bremen, relates an instance of unregenerated superstition that came beneath his observation under the very eyes of the Presbyterian missionary established among the Chilkat tribe:

During the months of February and March uninterrupted bad weather interfered so seriously with hunting and fishing as to cause great scarcity of food. The people were alarmed. The two shamans made the most strenuous efforts to propitiate the evil spirits, fasting, dancing, and singing night and day. But all this was in vain—the weather did not change—and it was necessary to find a reason for the unusual misfortune. At last the wise men came to the conclusion that the bad weather was the consequence of the burial of a child's body by the missionary during the preceding autumn. Huge fires were at once lighted and little images burned to atone for the burial of the child. When this measure also met with no success in producing a change of weather the missionary was urged and implored to reveal the burial place of the child that had risen to such unexpected posthumous importance, and when he very unnecessarily refused to comply men and women searched the vicinity for many days.

Thlinket tribes are now divided as follows:

1. The Chilkhaat tribe, of Comptroller Bay, numbering 326.
2. The Yakutat tribe, on the coast from Cape Yaktag to Cape Spencer, numbering 500.
3. The Chilkhat tribe, living on Lynn Canal, numbering 988.
4. The Hoonyah tribe, on Chichagof Island, numbering 908.
5. The Khootznahoo tribe, on Admiralty Island, numbering 666.
6. The Kehk tribe, on the Kehk Archipelago, numbering 568.
7. The Auk tribe, on the northern part of Admiralty Island and Douglas Island, numbering 640.
8. The Takoo tribe, on Takoo River and Inlet, numbering 269.
9. The Stakhin tribe, on Stakhin River and Etholin Island, numbering 317.
10. The Prince of Wales Island tribe, numbering 587.
11. The Tongas tribe, near British boundary, numbering 273.
12. The Sitka tribe, numbering 721.

To these must be added 788 Hyda, closely related to the Thlinket, living on Prince of Wales Island.

REPORT OF A MILITARY RECONNAISSANCE MADE IN ALASKA IN 1883.

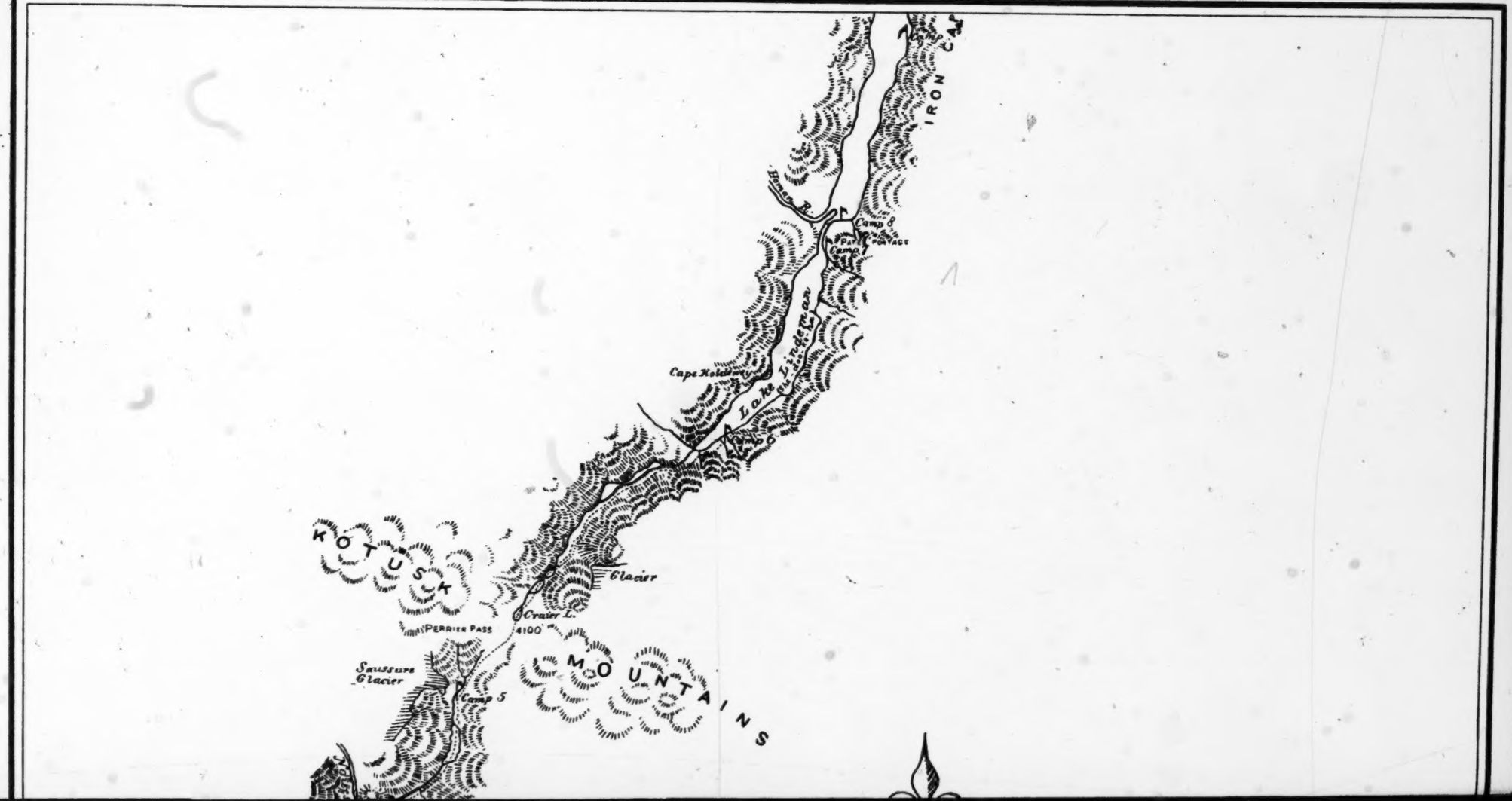
BY

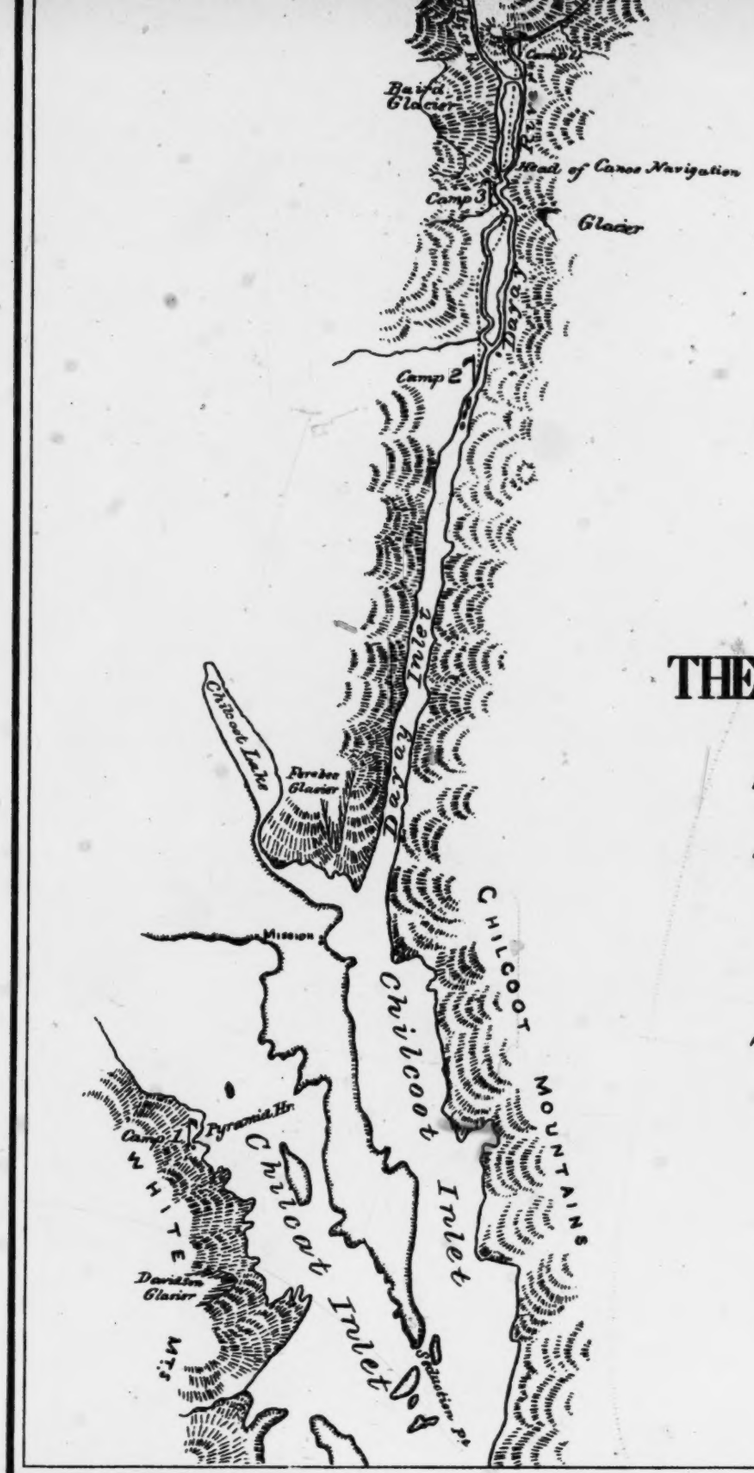
Lieut. FREDERICK SCHWATKA, Third Cavalry, U. S. A.

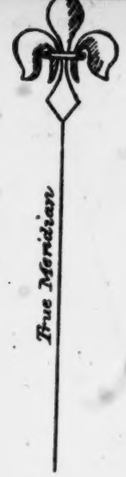
WITH

ILLUSTRATIONS AND MAPS OF THE ROUTE TRAVERSED.

Sheet No. 1.


IRON C.
Camp 8
Camp 7
Cape Kolderup
Lake Lindeman
Camp 6
KOTUSK
Glacier
Crater L.
PERRIER PASS
4100
Saussure Glacier
Camp 5
MOUNTAINS





PART 1

OF THE MAP OF THE ROUTE OF

THE ALASKA MILITARY RECONNAISSANCE OF 1883

LIEUT. FRED^K SCHWATKA, COMMANDER

EXTENDING FROM CHILKOOT INLET ALASKA To FORT SELKIRK, B.C.

539 MILES

BEING THE PART EXPLORED AND SURVEYED BY THE EXPEDITION

Drawn & compiled by CHAS. A. HOMAN, Top^l Ass^t U.S. Army.

Topographer of the Reconnaissance

NOTE:

Part II. extends from Fort Selkirk, B. C. to Fort Yukon, Alaska Territory, 490 miles., being the part surveyed by the party.

Part III. extends from Fort Yukon to St. Michaels, Alaska Territory, 1115 miles being corrections of previous surveys.

Part III is a correct transcript of the field notes of Topographical Assistant C. A. Homan, U.S.A.

Statute Miles.

0 5 10 15 20

Geographical Miles.

0 5 10 15 20

S Rep 1023. 56 1

MILITARY RECONNOISSANCE IN ALASKA.

By FREDERICK SCHWATKA, First Lieutenant, Third Cavalry.

INTRODUCTORY.

The expedition styled "The Alaska Military Reconnoissance of 1883," commanded by First Lieut. Frederick Schwatka, left Portland, Oreg., for Alaska, May 22, 1883, on the Pacific coast steamship's collier and freight steamer *Victoria*. The steamer touched en route at Astoria, Oreg.; Neal Bay, Washington Territory; Victoria, Vancouver Island, British Columbia, and Port Townsend, Puget Sound, Washington Territory. The officer chosen to head this, the first regularly organized military reconnoissance in Alaska, was First Lieut. Frederick Schwatka, of the Third United States Cavalry and aid-de-camp to the then departmental commander of the Department of the Columbia, Brig. Gen. Nelson A. Miles. His assistants were George F. Wilson, assistant surgeon, U. S. A., who acted as surgeon; Charles A. Homan, topographical assistant, U. S. A., topographer; Sergt. Charles Gloster, Company K, First United States Cavalry; Corpl. William H. Shircliff, Company G, Second United States Infantry; Private John Roth, Company I, Twenty-first United States Infantry; and J. B. McIntosh, citizen.

The *Victoria* crossed Dixon Entrance, the channel that separates British Columbia from Alaska Territory, early on the morning of May 29, and shortly afterwards entered Boca de Quadra Inlet, where freight was left for the Cape Fox Salmon Cannery, an enterprise just started. This cannery is in the Indian country of the Tongas and (Cape) Foxes. These bands are described under the title of "Native tribes visited." Lieutenant Schwatka has confined his report regarding the Alaskan Indians strictly to those bands or subbands that his party visited in whole or part, but having once opened the subject of any particular tribe, he has collected and transcribed all the available information concerning them he considered to be reliable. Further than the "Native tribes visited"—the most important information required of his military reconnoissance—he has made no division of his report, and all preliminary introductions, narrative of the expedition, description of the great river along which the party traveled and its adjacent country, the trade and resources of the districts visited, the astronomical determinations, magnetic observations, and topography, are all embodied in this, the general report, somewhat after the manner of a journal kept by a traveler.

NARRATIVE.

The inland passages of Alaska extend from Dixon Entrance to Cross Sound, a distance of 330 miles, if measured between estuaries communicating with the Pacific Ocean, or from Dixon Entrance to the head of Chilkat and Chilkoot inlets, a distance of about 375 miles, if measured within the limiting lines of latitude. Both measures are by the usually traveled steamboat route. The islands forming these numerous inland passages are known as the Alexander Archipelago, and with its adjacent mainland contains probably two-thirds the white population of Alaska Territory. The Indians inhabiting this same district speak the Thlinkit language, and, as a whole, are spoken of as Thlinkits, although divided into many subbands, each receiving its own particular name as Stickeens, Sitkas, Tongas, etc., each ruled independently by its own chief or chiefs in its own limited locality, and having but little sympathy in common. Among the whites

of the country they are spoken of only by these names of subbands or clans, and in the same sense should they be considered by the military, for the reason noted—i. e., their distinct and separate sovereignty as belligerant clans. Where intertribal alliances are likely to be formed as a result of a collision with one, this is noted in the particular tribe described wherever it could be ascertained. The Thlinkits were spoken of by the Russians as the Koloshes or Koloshians, and this designation is still occasionally heard in the Territory. In the Alexander Archipelago we visited the Tongas, Foxes (or Cape Fox Indians), Kootznahoos, Hoonahs, Chilkats, Auks, Stickeens, and Sitkas, and they will be found considered separately under the proper head. The distance we traveled in this part of the Territory was 810 miles, consuming from May 29, 1883, to June 11, of the same year, and the distance traveled from Vancouver Barracks, Washington Territory, to the crossing of Dixon Entrance, by the route already indicated, was about 1,070 miles. These inland passages of the Alexander Archipelago connect with similar ones indenting the coast of British Columbia, connecting with Puget Sound, in Washington Territory, across the eastern extremity or head of the Strait of Juan de Fuca, and by them, such transporting vessels as "sound boats," "bay-water boats," or even the lightest and fragile river steamers by watching favorable weather at occasional ocean entrances, can traverse this whole interior coast

FIG. 1.

line from Chilkat, Alaska, to Olympia, Washington Territory, a distance of about 1,060 to 1,100 miles by the usually traveled channel. From Fort Townsend, in Puget Sound, the nearest military post to this portion of Alaskan waters, the distance to these waters at Dixon Entrance by the inland passage is a little over 600 miles, and could be made by a small but powerful "sound steamer," with such Alaskan pilots as are usually available in Victoria or Port Townsend, in two days. The value of such a steamer, in case this portion of Alaska is reoccupied by the military as an auxiliary to their usefulness, can not be overestimated. Experts place its cost at about $35,000. The distance, in hours, for such a steamer, estimating at 12 miles per hour, and in miles, is given from Dixon Entrance to the principal villages of each tribe described under the separate subtitle of that tribe.

The Thlinkits or Koloshians have been variously estimated at from 5,000 to 20,000, although the latter is probably the nearer correct, and besides occupying the country noted, extend along the coast to the region of the mouth of the Atna or Copper River. But little can be said in a military sense regarding them as a whole, so much do they vary in the different subtribes, which variations are there noted. They are nearly all a strictly seacoast abiding people, the ease with which the waters furnish them with subsistence, and the great labor necessary for the same in the rough mountainous interior determining this mode of life. Their villages are mostly of a

permanent or semipermanent character, situated on the narrow beaches that occasionally occur at the foot of the mountains. They are of all quality, from fairly constructed log cabins to the most miserable shanties of rough inclined boards. The Indian village at Sitka can be taken as a typical one of the best construction, and I append herewith an illustration of a limited portion of it. Villages of such substantial structures would require the lighter forms of artillery, as Hotchkiss, mountain howitzers, etc., should the resistance be stubborn, and in case of an attack upon them.

I do not believe, however, that there are over five or six villages of this construction and capacity in the whole archipelago. Where the soil would allow it, some of the Thlinkit tribes have dug cellars underneath their cabins for storage purposes, and also with an idea for defense. The moral effect on the savage mind of a few shells would make them untenable.

The subject of the superstitions of a savage race in its bearing upon military considerations of them has no importance except so far as their medicine men, or shamans (pronounced showman), as they are called in Alaska, have power to instigate, carry on, or prevent war. In this connection the shamans are discussed in each tribe described.

The Thlinkit transportation is one that varies but little with the different tribes, although

FIG. 2.—Thlinket war canoe.

noted in each. They have two distinct sizes of canoes, the large or war canoe, which may hold from 25 to 50 or even 75, and the smaller ones for personal use, holding one or two individuals. The former, once very numerous, are slowly becoming obsolete, or really degenerating into medium sizes used in transporting household effects from one village to another as the fisheries change their location on which they are dependent. I annex a good illustration of a war canoe taken from Lieutenant Wood's article in the Century Magazine of July, 1882, "Among the Thlinkits of Alaska."

I believe that most of their boats are swifter than any that we could bring against them, not propelled by steam. They are as good masters as we of the art of sailing whenever that mode can be adopted. If the old military posts should be reoccupied or new ones established, each one should therefore be furnished with a steam launch swift enough to run down these canoes and large enough to carry a combating force equal to any village that it may be called upon to assail within the limits of its district. Tongas, Wrangell, and Sitka were the points within the Alexander Archipelago occupied by troops before it was ordered to be abandoned; but so many new industries have developed within that time, and other changes been made that vary their usefulness, that they should not be reoccupied or new posts established without a critical examination by the proper officers for such duty. The site personally selected at Killisnoo by the late

Bvt. Maj. Gen. Jefferson C. Davis, U. S. A., at one time commander of the Alaskan Department, is well situated and constantly growing in importance.

The grasses of this country are in sufficient quantities to sustain the limited number of animals that would be required at a military station for police and post duty, and the fact that the character of the country makes it impracticable to use mounted troops effectively, if at all, makes the subject of small importance. Baled hay can be readily obtained for winter forage.

Water supplies for posts are unexcelled in the numerous mountain streams emanating directly from glaciers and snow banks on the high hilltops, and nearly all of these can be dammed at altitudes that would give ample reservoir for fire or sprinkling purposes or to conduct water through a post by a system of pipes. Such methods have already been used in the salmon canneries lately erected in this part of Alaska.

Wood is plentiful and fuel should be obtained as reasonable as at any post in the department proper. Yellow cedar and Sitkan spruce, or balsam fir, is in ample quantities for timber, and a portable sawmill would save considerable in the construction of a post in furnishing rough lumber, which is expensive from the high rates of freight to this part of the Territory. Coal has been found, but not in proper quantity or quality.

While the hardier varieties of vegetables can be grown here with a little harder labor than in more temperate climates, I think that, in general, post gardens would be found to be failures, the limited areas of fertile soil, the ready access to Portland and Puget Sound markets, at much cheaper rates, and the uncertainty of success in a garden from year to year determining this. Such vegetables as can be grown here, and that would be more or less injured in their freshness by long transportation, would probably be raised in small gardens, while the standard varieties, as potatoes, onions, etc., usually issued to troops, would be supplied by the proper department from the markets indicated, the ease with which they can be reached making the matter of post gardens of little importance compared with the isolated frontier forts.

The beef or fresh-meat supply will be the hardest to meet, considering the well-known craving in the American soldier for good, warm-blooded meats. With a small steamer at the disposal of the military, as already suggested, there will be but little trouble in supplying this from Puget Sound markets at Fort Townsend rates, but in case this transportation is done by private lines the expense for any number of troops will be considerable. There are very few places in this part of the Territory where a herd of cattle could be kept even in the summer beyond the time that would be necessary for them to pick up the flesh they had lost in transportation, but meat once killed can be kept quite a while in good condition with but very little trouble. Hogs will do better, and will probably enter into the soldier's diet in a larger ration than at other army posts. A bill of fare in this part of Alaska can be varied by clams, mussels, herring, codfish, salmon, and halibut, in the way of cold-blooded meats, the latter existing in large quantities. In fact nearly all sorts of fish swarm in these waters, the principal industries being fisheries, and likely to remain so until civil law is extended over the Territory so as to protect lumbering and mining interests, these three being the staple industries, present and prospective, of southeastern Alaska. Venison, wild goat, mountain sheep, and black and brown bear's meat may be had occasionally. Ducks and geese are abundant in their season.

The general healthfulness of this district will compare favorably with any in the United States, only such diseases as are produced or aggravated by prolonged damp weather—the general climatic state of this country—being worthy of notice in their causation or therapeutics.

As to the general warlike tendency of the Thlinkits it must be said that they have been very peaceable since we have come into possession of the country, with but a few exceptions, although some of their belligerent acts show that they can be very combative when that faculty is aroused. The Kakes of Kuprinoff Island of the Alexander Archipelago, as late as 1857, made a hostile excursion in their war canoes as far as Puget Sound and killed the collector of customs at Port Townsend. The Chilkats, in 1851, made a descent of over 500 miles from their country, across the mountains, down the Upper Yukon, with its lakes and rapids, in order to burn a Hudson Bay post (Fort Selkirk) that was interfering with their inland trade. Such acts do not belong to a very cowardly race, and these acts could be extended beyond those cited. The bold, rugged

character of their country, the consequent severe exercise necessary to procure skins for clothing in the past generations, and the results still inherited more or less in the present, the large number of petty tribes constantly jarring about mooted matters of savage politics, all go up to give them a sort of warlike morale, not to be expected by the closest student of Indian character, who might superficially reason from their fish-eating, easily subsisted, and present indolent and quiet existence. Like all Indians, however brave, they are mortally afraid of cannon, Gatling guns, and any other large arms not used by themselves, and a single well-directed shell would have more moral effect and less fatal results in bringing them to terms than a village full of corpses produced by weapons with which they are familiar and can meet man for man, gun for gun. The fact, already noted, that all their villages and camps are near the edge of navigable waters makes this statement of military importance in the consideration of these tribes.

The arms of these tribes are quite inferior in quality, but are gradualy improving as the country is settling up, and it will be a mere matter of time when they may be equal if not superior to ours. Their sources of supply for ammunition, while adequate for present wants with muzzle-loading guns, will be more precarious as they adopt improved weapons, and doubly so in case of war. The quality of arms and sources of supply of ammunition are more minutely described with each tribe.

The most friendly feeling exists between the white people and Indians of the archipelago, and this is quite noticeable among the older and permanent residents of the former class, many of whom declare that if a war is ever occasioned it will more than likely be the fault of the whites. Such expressions, so foreign to frontier parlance, augurs well for the relations between the two elements. Through the medium of labor offered by the new industries springing up in this coast-water strip, the Indians are gradually learning the value of money and its many benefits, and where this foothold has been gained all other benefits in their behalf sink into insignificance compared with it.

Everywhere I found a sincere desire for the reoccupation of Alaska by the military, more probably in the fact that it represented some permanent form of law and order than any anticipated trouble from Indians. The unsolicited expressions conveying these desires, often the first part and burden of the conversation, were too prominent and general not to be genuine. In fact, it was their prominence and from evident desires of citizens that this paragraph finds its way into my report, for it formed no part of my instructions. The almost total lack of civil and criminal law in Alaska is also beyond my province, except so far as it might possibly affect the military if called upon; but no good citizen can visit the Territory and see the many evils resulting therefrom without at least noting them as a fact, whatever may be the object of his visit.

In closing this general account of the Thlinkits I shall give a very brief summary of the principal tribes not visited and described in full, using the best data obtainable.

The Hydas or Haidahs inhabit the southern part of the Alexander Archipelago and the northern part of the Queen Charlotte Archipelago (the northwestern outlying islands of British Columbia), and number about 500 in Alaska Territory, one-third of whom, as with the rest of the Thlinkits, may be considered warriors. There are two main villages of them, the Kaiaganies near Kaigan Harbor, and the Kliarakans near the Gulf of Kliarakan.

The Hennegas, in and around Cape Pole, number probably 350 to 400.

The Chatsinas, not far from the latter and numbering probably a trifle more. The last two are reported to be more peaceful than the former, who are credited with having murdered the crew of a small trading vessel visiting their country.

The Kakes (Kakus) already noted, who occupy the Kuprianoff Island, the greater majority of whom are concentrated on the northwestern part, in and around the village of Klukwan. There are estimated to be between 800 and 1,200 souls. They are one of the most warlike bands of the Thlinkits.

The Kous or Koos, numbering 600 to 700, are very similar to the Kakes in disposition, and occupy the shores of Kou Island, just west of the Kuprianoff Island, with their principal village (Kou or Koo) directly opposite Klukwan, the Kake village, and almost in sight of it.

The Sundowns (or Soundun) and Takos, numbering 350 to 450, who live on the mainland from about Tako River to Prince Frederick Sound, their principal villages being Shuk and Sundown or Soundun, both on Stephens Passage.

The Hoodsuahoos, numbering 750 to 900, who live along the northern shores of Chatham Strait.

Besides these there are the Asonques and others of less importance and of whom but little is known.

We left the Cape Fox Cannery in Boca de Quadra Inlet shortly after noon of the 29th of May, and proceeded toward Wrangell, which is on the northern part of an island of the same name, arriving there at 4.30 a. m. on the 30th. Near here was Fort Wrangell, one of the three posts formerly occupied by the military. The Indians in and around this point are Stickeens, described under the head of Indian tribes. Their immediate village lies on the rocky beach just east of the town, and is of the usual stereotyped Thlinkit character, a row of log buildings between high tide and dense timber, with gable ends facing these, and back of them the graves of the medicine men, all others being burned, I believe, while in front are the totem poles, signifying the "family tree," of the particular cabin dweller before whose door they stand.

Wrangell itself is not much less rickety in appearance than the Indian village alongside, and is kept alive by the miners passing to and from the Cassiar mines on the Stickeen River within the British possessions. Many of these miners also winter here, and there is much more business done than its lifeless appearance would indicate.

We left Wrangell at 8 a. m., rounded Cape Ommaney, the southern cape of Baranoff Island, between 5 and 6 p. m., en route to Sitka, where we arrived at 5 o'clock next morning, May 31. Baranoff Island, with Sitka on its seaward face, is the land of the Sitka Indians, a tribe described in full in the proper subhead. Sitka Harbor is one of the best in Alaska Territory, and while the channel is a little tortuous, once within it is finely protected by an outlying chain of islands and reefs. The old Russian barracks at this place were once occupied by troops and are still kept in good order, and furnished ample shelter to the marines of the man-of-war stationed in Alaskan waters under the orders of the Treasury Department. Like all points facing directly on the Pacific coast of this continent, and which are under the influence of the deflected Japanese current, its climate is much more equable, both summer and winter, than corresponding points inland and on the Atlantic coast. The mean summer temperature, as shown by nearly twenty years' observations, is a little below "temperate" on the Fahrenheit scale, while the mean for the winter is about "freezing" on the same scale.

The wreck of the *Eureka* in Peril Straits, just north of Baranoff Island, was visited in order to leave some wrecking machinery, and a good chance was had to visit the shore and get a general idea of the character of the land. The rugged inequality of the land, its constant intersection by channels of the sea, large and small, have all been dwelt upon. Viewed from these channels nothing is seen but a dense growth of dark evergreens, covering the steep mountain sides, and one would think from the great incline that it would be at least well drained and dry. But even here there is a thick spongy covering of moss, amply saturated with the numerous rills trickling down the hill, and which makes climbing more than doubly laborious. It covers dead logs, quaking bogs, and slippery shale or shingle, and persons can not tell when they will receive a severe fall or sink in up to their knees, if not farther. Once on top of the hills, a few openings clear of timber are found, but if anything the bog is deeper, the moss thicker, and a luxurious growth of aquatic plants and bushes often conceals the innumerable small ponds connected by a network of sluggish channels of oozy mud. Here bear, deer, or mountain goats may be encountered, but from the difficulties presented Indians or white men do very little hunting. Everyone travels by water and by water alone.

On the 1st of June, about 4 p. m., we reached Killisnoo, in Chatham Straits. Killisnoo was formerly a whaling station of the Northwest Trading Company, and has been converted into a cod-fishing station, which must be remunerative from the improvements they are making. A large pile dock, probably the finest in Alaska, gives easy access to their buildings on the land. Directly opposite this is the village of the Kootznahoo Indians (described farther on in full), and

the site picked out by the late Bvt. Maj. Gen. Jeff C. Davis, colonel Twenty-third Infantry, as the best in the archipelago for a military post. Since that date its importance for such an object has become more marked by the geographical distribution of the new industries springing up in this part of Alaska. A great many of the Kootznahoo Indians had their faces blackened, a fact I noticed among a number of other tribes to a greater or less extent, which was explained as being a protection from the bright glare of the waters while fishing on them.

Twelve hours' run from Killisnoo, almost due north, brought us to Pyramid Harbor in Chilkat Inlet at the head of the Lynn Channel. Here there are two salmon canneries, recently erected, one on either side of the inlet, with good prospects that I have since heard have been fully verified. I disembarked my party at Pyramid Harbor at the large cannery of the Northwest Trading Company on the west side of the inlet, and everything was done by Mr. Carl Spuhn, its superintendent, to facilitate my movements in this vicinity, and to assure the success of my expedition in the future, and his aid was of the most serviceable character.

My instructions, "to endeavor to complete all information in each section of the country before proceeding to another, in order that should time not permit the full completion of this work it may be taken up the following season," had induced me to choose the valley of the Yukon River as that district of the most importance in the Territory and of which little or nothing was known in a military sense. The slow progress that had been made in previous explorations from its mouth, fighting its swift current, led me to think that this obstacle could be made to subserve my purpose in descending it from its head if it could be reached under favorable circumstances. Also the fact that I was in general expected to complete any chosen district in a single summer had weight in investigating the Yukon River from this end. There are some three or four passes through the Coast Range of Alaskan mountains leading from the inland passages of the Pacific Ocean to the sources of the Yukon River, one of which, called the Tahko, I believe had been crossed by Mr. Byrnes, a practical miner, who, employed by the Western Union Telegraph Company in 1867, made this journey as far as Lake Tahko of my map, coming down the river, marked coming in on its south side, and was here recalled by a courier sent by the company, who had abandoned the enterprise owing to the success of the Atlantic cable.

No surveyed map was made of this journey or ever demanded by his employers, as near as I can learn, and if the rest is as inaccurate as the part he has furnished from memory, and which I afterwards visited in small part, this route is still open for exploration.

The Lynn Channel, at its head, divides into two deep inlets, the Chilkat and Chilkoot, each receiving rivers at their heads, and from these valleys lead out trails that reach different sources of the Yukon River, and that have been known to have been traveled by the Chilkat and Chilkoot Indians, respectively, for many years in the past, the object of these expeditions being to trade with the interior Indians, the Tahkheesh, or, as the white men call them, the "Sticks."

Over the first pass (the Chilkat) to the head of the Tahkheena the only explorer to traverse it has been Dr. Krause, of Berlin, sent out by the Bremen Geographical Society to make explorations and especially ethnological collections in the Schukchi Peninsula of Siberia and Alaska. Since returning, I also learn by his report to that society that he had traversed the Chilkoot Pass. These maps, like all work done by the Krause Brothers, were of the most excellent character and valuable for future reference. They appear in the proceedings of the Bremen Geographical Society for 1882, and should be copied and kept on file in the proper office of these headquarters. From Indian reports I understand that it takes about twelve days for them to make this Chilkat-Tahkheena portage, carrying their effects upon their backs, but once over this long portage the Tahkheena has no important falls or rapids from the lake at its head to its junction with the Yukon. The Chilkat River has also a trail at its head leading over to the stream emptying into Yukatat Bay, which the Indians make, loaded as described, in about fifteen to eighteen days. I was told by one, who is undoubtedly good authority, that these two trails were the only ones used by the Chilkats going from the inlet and river of the same name back into the interior, the Chilkoot trail being monopolized by the Chilkoot Indians, although they are a sort of independent subtribe of the Chilkats and often associated with them in descriptions, and in reality closely interwoven. The Chilkoot trail leads up the inlet to a branch one called the

Dayay and through it to the mouth of a river of the same name, thence to its head and across the mountains to one of the sources of the Yukon, and requires only three or four days to be made, its disadvantages being the 3 or 4 canyons, rapids, or cascades that obstruct that part of the river to which it leads. It was the route taken by my party, and is described more in detail in the running account of the voyage. Over it the Chilkats were not only allowed to travel, but the Indians of the interior, the Tahkheesh or "Sticks," are permitted to cross out to the Pacific waters, a blockade once thoroughly maintained against them by both Chilkats and Chilkoots over their respective passes. Mining parties, in small numbers, had also crossed this trail in order to prospect the head waters of the Yukon for valuable minerals, but as far as any results were obtained, outside of their imposed labors, nothing had been gained by their attempts; still their adventurous efforts should receive the highest commendation, for had they been or should they be successful in developing rich mineral in this section of the country (which must be limited in its industries to minerals and fisheries), they would do a practical good only to be measured by the value of the discoveries.

The Indian packers over these mountain passes usually carry 100 pounds, although one I had walked along readily with 127, and a miner informed me that his party employed one that carried 160. The cost of carriage of a pack (100 pounds) over the Chilkoot trail for miners has been from $9 to $12, and the Indians were not inclined to see me over at any reduced rates, despite the large amount of material required to be transported, some 2 tons. By giving them two loads, or doubling the time over the portage, a slight reduction could be had, not worth the time lost in such an arrangement, and I made contracts with enough of them to carry my effects over at once. Mr. Spuhn was also very energetic in his efforts to secure for me better terms, but without avail, and after I had crossed the trail I in no way blamed the Indians for their stubbornness in maintaining what seemed at first sight to be exorbitant, and only wondered that they would do this extremely fatiguing labor so reasonably.

The head chief of the Crow clan of the Chilkats had died about the time of my arrival, and his sumptuous funeral, conducted in a village about 15 miles above Pyramid Harbor, stretched over several days of feasting and orgies before his body was to be burned on a funeral pyre, seriously threatened to delay my expedition getting away, but I do not think we lost over a day thereby.

The party got away at 9.50 a. m., in a large skiff and 9 or 10 canoes towed by the launch *Louise*, belonging to the Northwest Company, the latter carrying the heavy effects and the former mostly loaded with the Indians, some 40 to 45 in number, intended as packers. The course was down (south) the Chilkat Inlet around Point Seduction and up (north) the Chilkoot Inlet to the Chilkoot mission, now occupied by the Rev. Mr. Willard and family as a missionary station and school, and was formerly the trading station of the Northwest Company until their cannery was established in the Chilkat Inlet. I walked across the narrow peninsula separating the two inlets about 3 miles, I believe, and found it well wooded, the trees doing well enough for sawing timber if required. There was grass 4 and 5 feet high on the trail, and the innumerable flowers in bloom looked very much unlike the general idea of Alaska, until the mountains that surround these little valleys were brought in view with their tops and gulches buried in snow and glacier ice.

At Chilkoot mission 4 or 5 canoes with the usual complement of Indians (about 20 Chilkoots) were attached to the already long chain, and at 2.15 p. m. got away up the Chilkoot Inlet. Shortly after we entered the Dayay Inlet, an arm of the former, and at 6 o'clock p. m. reached its head where the Dayay River comes in. Here the effects were lightered ashore in the canoes and skiff, and the launch returned. Before camping, the stores and supplies were put in canoes and "tracked up" the river about a mile, the mouth of the stream being really but a complex mass of mud flats, here deposited by the river and held back by the tides and prevailing southern storms. A short distance above the new camp (No. 2) a camp of Tahkheesh or "Stick" was found, and I employed a few to complete my quota, and also to relieve those that had brought along squaws, their wives, to do their complement of the hard work, these poor creatures receiv-

ing nothing for their labor. Also a spare one was secured in case of sickness in such a large force.

The Dayay Inlet and valley is of the same general character as the inland passages of the archipelago, a river-like inlet between high hills covered with spruce and pine nearly to the top, the latter predominating in the lower levels, the former in the higher, and capped with barren granite mountains, covered on the top and in the gulches with snow and glaciers, which furnish water for innumerable cascades and waterfalls. These glaciers on the mountain tops become better marked as the river is ascended. One on the west side of the Dayay may be said to commence opposite the mouth of that stream, if not before, and continue along it some 10 or 12 miles until its outline could no longer be followed in the fog and mist that nearly always cling to their faces, especially during the warm summer months, when the atmosphere charged with moisture from the warm waters of the near Pacific is driven against them by the sea breezes.

The Oregon blue grouse could be heard hooting in the woods, and in the quiet evenings a perfect chorus of them filled the air. Trout had been caught in the fish-weirs of the "Stick" Indians, and offered us for sale, although the most persistent fishing the whole length of the river with both fly and bait was unrewarded. This may be due to the discoloration of the water by a whitish mud ground off the mountain sides by the glaciers cutting through calcareous rock. The tracks of black bear, fresh and old, were very numerous, and one was seen but not secured. The valley of the Dayay, like so many in this part of Alaska, would make a favorite summer camp for those officers and men who wished to break away for a while from the routine monotony of garrison life. Mountain goats and deer can also be added to the game list. From the foot of the steep mountains on one side of the Dayay Valley to the other—about one-half to three-fourths of a mile—the river bed and the valley is filled with great bars of bowlders, sand, and coarse gravel, with here and there groves of poplars, willows of several varieties, and birch. The river is very swift, averaging from 30 to 75 yards in width to the head of canoe navigation in a cascade 10 miles from its mouth, although half as far again probably by the stream, winding from one side to the other of its narrow valley. It often breaks into many channels, and occasionally a fording place for footmen can be found in wide shallow rapids. To the head of canoe navigation most of the party's effects were "tracked" in canoes, although those Indians not having these craft were compelled to at once commence carrying their loads upon their backs, their ungenerous companions not allowing them the use of their canoes, although as far as I could see it would have entailed no extra labor to have done so. That it was mere selfishness is shown in the fact that I knew several of them even refused to ferry their loads across the stream, thus forcing the packer to a devious route to some fording place, or even over the mountain spurs to avoid it altogether. In cases of sickness of companions they are no better, stoutly demanding a share of the spoils, and I had no occasion to regret my spare packer taken along for such emergencies. These strictures apply to the Chilkats and Chilkoots, the Tahk-heesh or "Stick" Indians forming a commendable contrast, their reasonable and humane conduct to each other being noticed whenever they were encountered, from here nearly to old Fort Selkirk.

Directly at the head of canoe navigation there is no good camping place, and our camp (No. 3) was made about a mile short of the cascade that marks it. We white men had been compelled to wade the river a number of times to reach it, but our spare packer had been used as a means of transportation, his legs being more used to the ice-water just from the glacier beds on the hill-tops.

After going into camp the greater majority of the Indians spent their spare time in gambling at a game called la-hell, in which there was a free interchange of dirty clothing and prospective wealth accruing from this particular trip, their orgies and rude savage songs often lasting past midnight. This, combined with the Pompeiian pictures engraved on their rude birch-bark hats, showed that they were still open for missionary effort.

About 2½ miles beyond the head of canoe navigation on the Dayay the Nourse River comes in from the west, and although receiving a different name by the Indians (the Kut-lah-cook-ah) is really the greatest in breadth and volume of water of the two forks. The valley of the Nourse

is alpine and picturesque beyond description. A large lake is found at its head according to Indian authority, a system of sources quite common among the rivers of this mountainous part of the country. A short distance beyond the mouth of this west fork camp No. 4 was established near some perpendicular blocks of basalt rock, and in view of another glacier extending down between the two rivers. Here a dense grove of small firs near the river bank kept a number of the Indians busy cutting long, slender fishing-poles which they put away in secure places to be taken home upon their return from my expedition. These poles, when seasoned, are pointed with a double-barbed gig, like the one shown in the figure, and which is a very common fishing instrument among all the natives of sub-Arctic America.

Up to camp 4 the labor had been very light, even for the packers, and believing it to be a fair indication of the trail ahead, I had come to the conclusion that their high charges were exorbitant and the portage very easy to be made.

On the 10th the party started at 7.30 a. m., the trail leaving the narrow valley, oftentimes not wider than the river bed itself, and leading up over the mountain spurs of the eastern side of the stream. The inland walking has already been described, and the present was no improvement on it in any particular. Occasionally the path would debouch into the river bed wherever it was wide enough to give a mile or two of walking and wading, and then would strike over the mountain sides again. At places on the latter it would be very easy to lose the trail where they followed for long distances over great winrows and avalanches of broken bowlders and shattered stones varying in size from a person's head to the size of a small house. These grand barricades of bowlders, more often of crescentic shape across the course of some steep gulch or ravine, are of very recent origin, as shown by their often embedding willow and birch trees not over 20 to 30 or 40 years old and still alive, half way up to their tops or 10 to 20 feet from their original stumps.

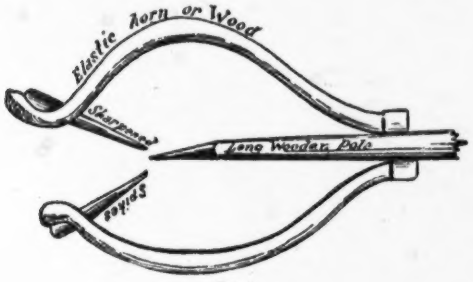


FIG. 3.

Although the distance to camp 5 was but a little over 10 miles, it was fully equal to 30 miles over an ordinary road, and consumed twelve hours in passing over it, the greater part of this time, however, being occupied in resting from the extreme fatigue incurred while traveling over short but severe stretches. The last few hundred yards was over snow banks, and with the pass through the coast mountains directly ahead of us covered with snow to our feet. This camp 5 is at what is known among the Indians traversing this pass as the "stone house," but is really only a jumbled mass of huge bowlders so thrown together that the natives can crawl under them and find sleeping places without being in contact with the snow.

Nothing could show the endurance of these Indians better than to state a fact that occurred after going into camp at this place. A mountain goat was seen on the highest ridges of the mountains to the west of the valley, some 2,000 to 2,500 feet above our position, and was immediately hunted by one of the Indian packers, who passed around him and came back upon his position, frightening him, however, before he could get a shot. He then chased the animal, almost keeping up with him, down into the valley where we camped, and up the steep mountain slopes of the eastern side, equally as high as those mentioned, and all this immediately after he had carried over 100 pounds across the trail which has been described.

The greater portion of the Indians and white party were under way on June 11, shortly after 5 o'clock in the morning, and the pass through the mountains directly ahead at once essayed, and so steep and difficult was it that it was not before 10 o'clock that morning that we had reached the crest, 4,100 feet above the sea-level and probably 3,000 feet above camp 5, although the distance gained forward could not have been much over 2 miles. It seemed marvelous beyond measure how these small Indians, not averaging, I believe, over 140 pounds each, could carry 100 pounds up such a precipitous mountain, alternately on steeply inclined glacial snow and treacherous rounded bowlders, where a misstep in many cases could have hurled them hundreds of feet down

the slope or precipices. The stunted branches of trailing vines and their roots, and even on their hands and knees, were often used in the steepest ascents. Many of them had rough alpenstocks cut in the Dayay Valley with which they steadied themselves in bad places, and on the snow covering the mountain sides trails were made by advance parties arranging footholds inclining inward before essaying them with their packs.

I would state here for the information of the department commander that photographs taken by the dry-plate amateur process were secured at such places as were of interest and the time and method of transporting would allow. Mr. Homan, topographical assistant, acted as photographer. The plates, originally 5 by 8 inches, have been compelled to be trimmed down to the size submitted herewith, owing to some defect in the camera or lens in not extending the view fully to the edges of the plate. Many of the plates are defective, as will be seen by inspection, and are only fit to be used by artists in securing accurate sketches of the country or incidents portrayed. I have since learned from a professional photographer, Mr. Davidson, of Portland, Oreg., who has developed my plates—42 in number—that considering the brand and reputation of the plates used, the cheap character of the photographic apparatus, and the rough nature of

FIG. 4.

such an exploration, with its crude transportation, that the photographer deserves the greatest credit for doing so well under such circumstances. I would like to add that no expedition for obtaining information of any character should be sent to such an isolated and imperfectly understood country as Alaska without a photographic apparatus and accessories of the very best character, and with a good trained manager for the same if possible. The greatest good to be obtained is too evident for discussion.

Fig. 4, given above, is a view of camp 1, at Chilkat, Alaska, looking directly against the bold bluff back of the cannery of the Northwest Company.

After departing from Chilkat but two of the tents were used or carried along, and a great deal of the heavier and less useful baggage left in charge of Mr. Carl Spuhn, at the cannery. Back of the center, between the two middle tents, can be seen a bank of snow (June 6, 1883), and in such protected places these can be seen the year round, even at the sea-level, and in positions well separated from glaciers, where they would be expected to be found.

Fig. 5 represents a view from same standpoint as No. 2, but looking northward up Dayay Valley. Below the mist and fog covering the glacier of the mountain can be seen a small finger of the Saussure glacier putting down a little farther than usual.

The packing over the pass (named Perrier Pass) was of the most severe Alpine character of climbing, supplemented by the immense loads already described.

After leaving the notch in the pass, the hills or mountains still towering from 1,000 to 2,000 feet on either side, as near as could be roughly estimated through the drifting fog, and buried in glacier ice, the descent for the first two-thirds of a mile is tolerably rapid on to a lake, possibly an extinct crater, which it closely resembles, called Crater Lake, of about 100 acres in extent, and which the Indians told me, and which surroundings corroborate, is the head of the Yukon River. This lake was still frozen over (June 11) and the ice covered with snow in a melting condition.

I noticed that day that the Indians in following a trail on snow up hill, or on a level, or even a slight descent, always followed in each other's tracks as much as possible, so that my large packing train made a trail that could easily be accounted for by supposing that only five or six Indians had passed over it. When going down a steep descent, however, each one makes his own separate and distinct trail, and they scatter out over many yards. I thought this worth recording in estimating their numbers under such circumstances.

Some 6 to 8 miles of snow was passed over on the trail that day, the entire distance traveled being about 15 miles, reaching camp at 7 p. m., the distance being fully equal to 50 miles of

FIG. 5.

walking on an ordinary road. In many places before reaching camp the snow bridge over the river had tumbled in, revealing perpendicular abutments of snow banks often 20 to 25 feet deep.

Camp 6, the first one on the waters of the Yukon River, was on a beautiful Alpine lake, over 10 miles long, and picturesque beyond description. Here the greater majority of the hired Indians were paid off between 7 and 9 p. m., many of them returning that night over the Kotusk Mountains to the head of the Dayay at "the stone houses," it being light enough at midnight, especially on the white snow, to see the trail perfectly.

It might be of importance in a military sense to know if a Government pack train of mules could pass over the trail from head of canoe navigation on the Dayay River, or even the mouth of that stream to Lake Lindeman. As the trail now stands, or as we passed over it, I should say not; but believe one could be possibly found by a competent person inspecting this route for that particular purpose. As far as "the stone houses" a rough trail could be had by woodmen clearing it at needed intervals. From "the stone houses" to Lake Lindeman the trail would depend more on the time of year than any other function, it being better in winter when the snow would be harder than the spring or summer, although in these seasons I do not look on a trail as impracticable, if a proper search be made with that object in view. The fact

that the country beyond Perrier Pass, in the Kotusk Mountains, lies in British territory (as shown by our astronomical observations and other geographical determinations when brought back and worked out) lessens the interest of this trail beyond the pass to the military authorities of our Government.

On Lake Lindeman there were a couple of very dilapidated "dugout" canoes, and the Tahk-heesh or "Stick" Indians owning them representing that the lake was but a few miles in length, in fact just around Cape Koldewey, of the map, and that they could transport all my goods in two days, I accepted their offer, knowing that the draining river of Lake Lindeman was full of rocks, rapids, and cascades, which a raft, my proposed method of navigation, would not pass according to their testimony, and not desiring to build two within such a short distance. A continuous gale of several days from the south effectually put a stop to their contract, the consequent waves on the lake being sufficient to swamp them should they venture in such rough water. Accordingly, the 13th of June, about noon, the party commenced building the raft, which was finished the next evening, on a plan of 15 by 30 feet, and one deck of pine poles amidships, Mr. Homan deserving considerable credit for its plan and superintending its con-

FIG. 6.

struction, all the white men doing well, and the Indians as good as could be expected from their well-known aversion to monotonous work of routine character.

The morning of the 15th of June the raft was tested by eleven persons of the party on its deck and found to be inadequate for carrying all the effects and party, owing to the small logs of dwarf spruce and contorted pine with which the builders had been constrained to construct it. About half the effects were placed on board, and three of the white party put in charge, a wall-tent spread for a sail, and at 9.20 a. m. she was cast loose to sail the length of the lake, which she did by 3.15 in the afternoon, so strong was the wind blowing. Although waves fully 2 feet high were running, so well were the effects protected by canvas above and below, and so high was the pole deck, that nothing was injured by the water that constantly broke across the raft. Mr. Homan, Mr. McIntosh, and Corporal Shircliff had been in charge of her during this day. The remainder of the party walked overland by the eastern shore, the journey being very fatiguing, although a pack-train trail could be made here with a little work in shape of wooderaft. The remainder of the effects were brought by canoes in the hands of my own Indians.

I might add here that from the Kotusk Mountains, along the part of the Yukon River we traveled, as far as its junction with the Pelly, or at old Fort Selkirk, there is but one tribe of Indians, the Tahk-heesh or "Sticks," and these are described in their proper places. Therefore that much of the journey, nearly 500 miles, if described, would be of more value to geography

than the military, and I shall try and confine myself to that part of this section which will illustrate my raft journey, that being important in this country as a means of transportation, the swiftness of the rivers and their general freedom from obstructions being conducive to the employment of this primitive craft in traveling in one way.

A view on Lake Lindeman, looking backward from Payer Portage, or southward toward the Kotusk Mountains, the higher ridges of which, covered with glacier ice, have condensed a fog upon their slopes so as to be invisible. About half the length of the lake is visible. The draining river is to the right lower corner of the picture.

Through the river that drains Lake Lindeman, about a mile and a quarter long, before it empties into another lake, we shot the raft, June 16, losing the side logs and giving it a general shaking up that loosened many of the pins and lashings in the rapids, cascades, and over the rocks and bowlders, on one of which it stuck and had to be pried off.

The next two days were consumed in repairing the raft on a plan of 15 by 40 feet (really about 16 by 42, counting projections not included in plan) instead of 15 by 30 feet as formerly, while two pole decks were constructed with a rowing space between for side oars, the bow and stern oars being retained, however; larger and more buoyant logs were placed in, but unfortu-

FIG. 7.

nately none could be secured of sufficient size to go the whole length of the craft and give it that solidity which would be so much desired in striking sand, gravel, and mud bars, or waterlogged timber in swift currents, or sailing across lakes in rough weather.

The portage connecting the two lakes was called Payer Portage, and figure 7 is a view looking from this portage westward into a valley of a river (Homan River) coming in from that direction, and is given as a good representation of the valleys in this particular part of the country.

Fig. 8 is a view on Payer Portage (looking north along the trail) and represents a Chilkat Indian with two ammunition boxes going over the portage. The amount some of these packers will carry seems marvelous and makes estimates for pack mules or trails therefore seem superfluous. Their only packing gear is a couple of bands, one passing over the forehead, where it is flattened out into a broad strip, and the other over the arms and across the breast; the two meet behind on a level with the shoulder, and are there attached to lashings more or less intricate, according to the nature of the material to be transported. If a box or stiff bag, the breastband is so arranged in regard to length that when the elbow is placed against it (the box) the strip fits tightly over the extended forearm across the palm of the hand bent backward. The headband is then the width of the hand beyond this. At least I saw a few Indians arranging their packs and their harness according to this mode. The harness proper will not weigh

over a pound, and the lashing according to its length. The strip across the head and breast is of untanned deerskin about 2 inches wide, with holes or slits in the ends, protected from tearing out by spindles of bone or ivory.

Mosquitoes now commenced getting very numerous, and from here to the mouth of the

FIG. 8.

river they may be said to have been the worst discomfort the party was called on to endure. They often made many investigations, usually carried on in explorations, impossible of execution, and will be the great bane to this country should the mineral discoveries or fisheries ever attempt to colonize it. I have never seen their equal for steady and constant irritation in any part of the United States, the swamps of New Jersey and the sand hills of Nebraska not

FIG. 9.

excepted. It was only when the wind was blowing and well out on a lake or wide portion of the river that their abominable torment ceased.

Fig. 9 is a view from the northern end of Payer Portage northward into the second lake, named Lake Bennett, about one-sixth or one-seventh of the length of the lake being seen, it being

about 30 miles long. The draining river from Lake Lindeman comes in on the lower left portion of the view. The "Iron Capped Mountains" on the right being covered with glaciers are hidden in the mist these always produce this time of the year, especially on a day that would be favorable for taking a photograph.

On the 19th of June, with a favorable wind along Lake Bennett, we started from Payer Portage at 9.20 a. m., and by 3 in the afternoon the wind had increased to a gale, and by 5 the waves were running so high that the raft threatened to break in two, there being no logs running clear through the whole length, and at that time we sailed for the beach on the eastern side and finding a protected cove went into camp. There being a number of large logs at this place the next day was spent in putting four of them the length of the raft, and the 21st the journey was resumed. Eighteen miles from the head of the lake a large river comes into Lake Bennett from the west, which I named Wheaton River, after Brevet Major-General Wheaton, in temporary command of the department when the reconnaissance was organized, and to whom the expedition is indebted for many favors in putting it on a good footing for the accomplishment of its ends.

Lake Bennett was ended that day, the 21st, through a draining river called "Caribou Crossing" by the Indians, nearly 2 miles long, which empties into a small lake named Lake

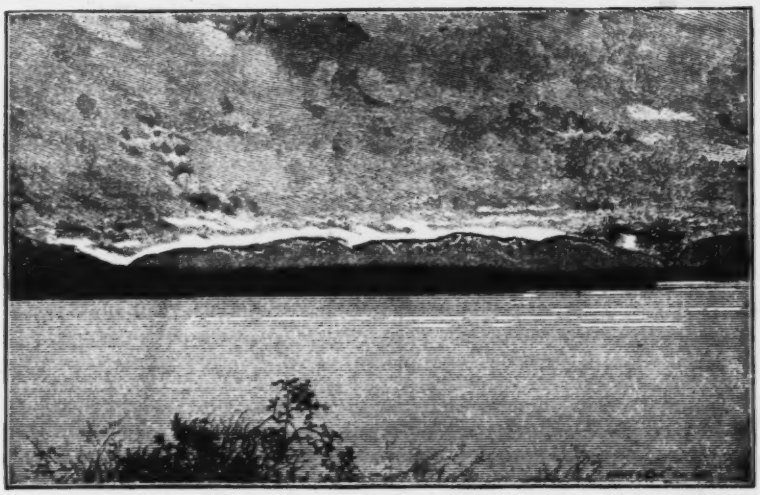


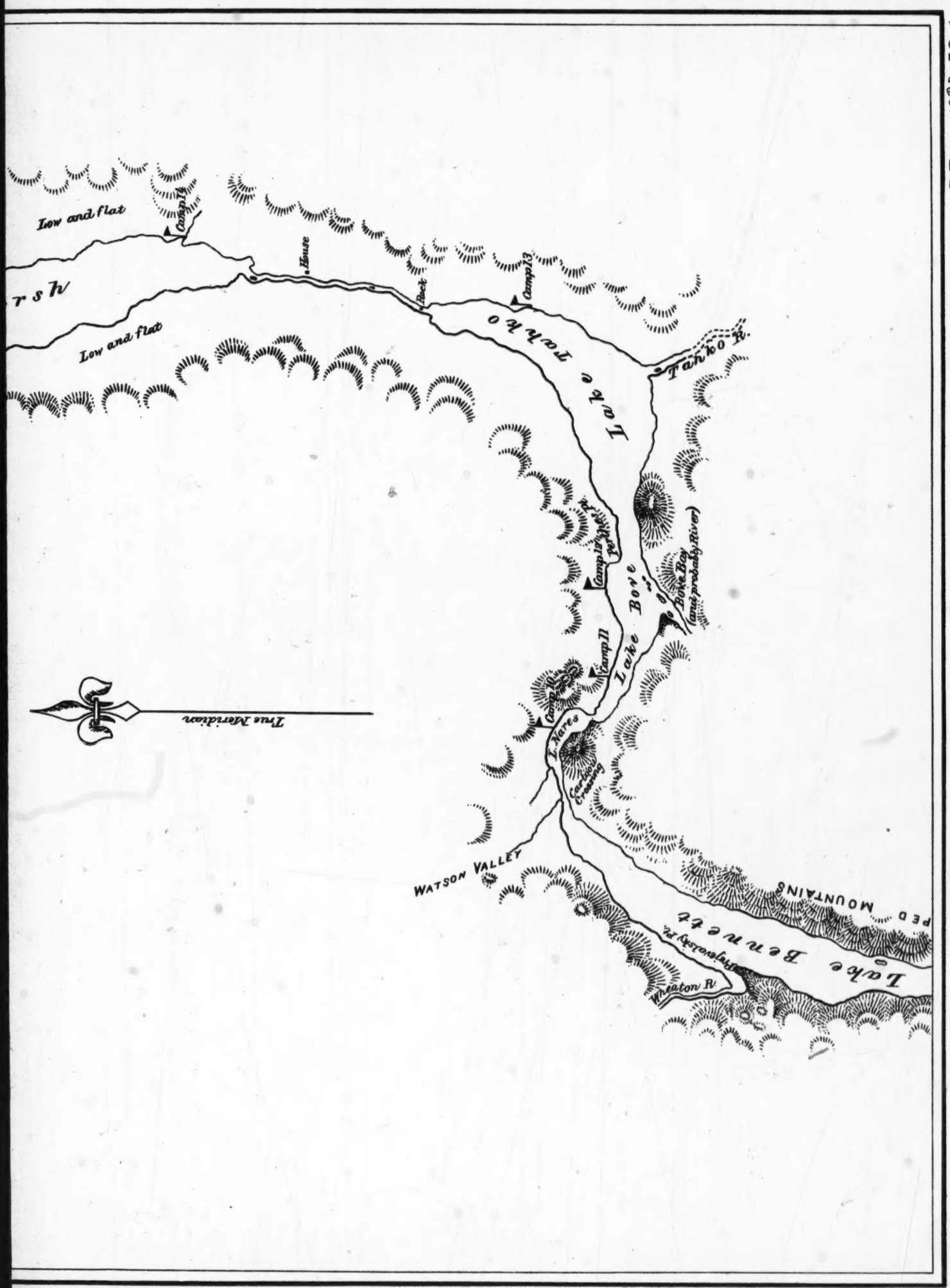
FIG. 10.

Nares, a little over 3 miles long. This lake turns square to the east, and the steady south wind was now so baffling on our new course that progress was very slow and annoying. After passing through the short draining river of Lake Nares, probably a couple of hundred yards long, another lake (Bore) 8 miles long, still trending toward the east, is entered, and around its eastern limiting cape (Point Perthes) Lake Tahk-o is entered, 18 miles long, and by the time its outlet is reached the northern course is resumed. My map shows the Tahk-o River coming in from the south, and to this part of that river a white man (Mr. Byrnes) has explored, although the remainder of the Yukon to Fort Selkirk is placed in full lines (the topographical significance of which is that it has been passed over by explorers engaged in map making) on many maps, notably the latest Coast Survey map by W. H. Dall, and a map in the same author's book entitled "Alaska and its Resources," although no white person has yet passed over this route until the present expedition and taken cognizance of its geography. All Alaska is filled up in this way with rivers and their branches, even on Government maps, that have yet to be traversed by white men in any capacity, let alone topography and survey. Probably the parlor authors of these maps think they are doing no more harm than giving way to a too eager desire of "making out a full map;" but in this connection I desire to state briefly an incident that will show this in another light: A party of miners being on this river, and discouraged at the pros-

Sheet No. 2.

Camp 17.
Yukon River
Low and flat
Rapia
Myers C.
Low and flat
Low and flat
Camp 16
McClintock R.
Low and flat
Camp 15
Lake Mars
Michie Mt

S Rep 1023 56 1



pects, had almost determined on returning, and one person, relying on the maps in their possession, had equally determined to go on, as the chart showed three or four Indian villages on the river, and by taking advantage of these he thought he could reach old Fort Selkirk, and from thence prospect at will. The party did not return, however, but on continuing their journey they found no relevancy between the map and the country traversed; and the single person referred to particularly noticed the absence of all Indian villages, and, worse than all, of all Indians even, and had he continued his journey alone, would more than likely have perished, or at the very least have undergone severe and unexpected hardships.

On the 26th of June, in passing out of Lake Tahk-o, we entered the first considerable stretch of river we had met—a little over 9 miles long—and were nearly three hours in floating through, although we remained stuck a short time on a mud flat in its current. Its downstream entrance is full of bowlders, forming a serious obstruction to navigation, but one that is possible with care and judgment. It is about 300 to 400 yards wide. On its right bank was a deserted Tahkheesh house, which, with one about 20 miles above the site of Fort Selkirk, are the only signs of permanent habitations from the Kotusk Range to the Yukon junction with the Pelly. Along the narrow river bank or lake shore between these two points are often seen three poles forming a

Fig. 11.

tripod—one of them much longer than the other two—which indicates the camping places of the few persons of this abject tribe. A dirty piece of canvas, or an old caribou skin riddled with holes, thrown over the longer pole, makes their tent, and this makes their residence for the greater part of the year.

The next lake, which I named Lake Marsh, after Professor Marsh of Yale College, is nearly 30 miles long, noticeably wider than any of the previous ones, and so full of mud banks extending out from the shore that the raft, which drew from 20 to 22 inches, could seldom get nearer the beach than 50 to 100 yards, and through the soft mud for that distance the camping effects had to be packed on our backs at each of such places.

Fig. 10 represents a limited view on Lake Marsh looking to the southwest from camp 14 of the reconnaissance. Directly over the point of land in the right of the picture is seen the gap where the Yukon empties into Lake Bove, and the next gap over the left center is the one made by the Tahk-o coming in from the south.

Fig. 11 is a view looking north along the same lake from the same standpoint, about one-fifth the length of the lake being under the eye in the two photographs.

Thus far it had been noticed that the trees leaned in more or less conspicuous inclinations toward the north, thus plainly showing the prevailing direction of the stronger winds, and this

is of importance in calculations leading to expeditions down this part of the river in any sort of craft needing sails for propulsion.

The heavy growth of last year's grass shows undoubtedly good grazing, but the mosquitoes in the summer and the intense cold in the winter would not warrant this industry—cattle or sheep raising—being undertaken in this part of the country until all stock ranges in every other part of the world had been exhausted. The many tracts of yellow grass looked not unlike the stubble fields in more temperate climates.

The afternoon of the 28th of June, from 12.15 until 2.15 o'clock, we experienced a very decided thunder shower coming from the east, and which is the first, I believe, ever chronicled on the Yukon River, they being unknown on the lower part of this great stream.

That date, the 28th, we sailed past midnight, so important did we deem it to take advantage of every breath of wind in the right direction, especially on the lakes, and at that hour of the night we were close enough to the Arctic Circle to read type the size of ordinary newspapers, and but one star, Venus, was visible in the unclouded sky.

The 29th of June we passed out of Lake Marsh into the river, past the mouth of a river, the McClintock, that we took to be the outlet. The river valley was now wooded to the water's edge,

FIG. 12.

and it was often hard work to find a good camping place in the dense growth of willows that lined the bank. Muskrats were numerous in this part of the river.

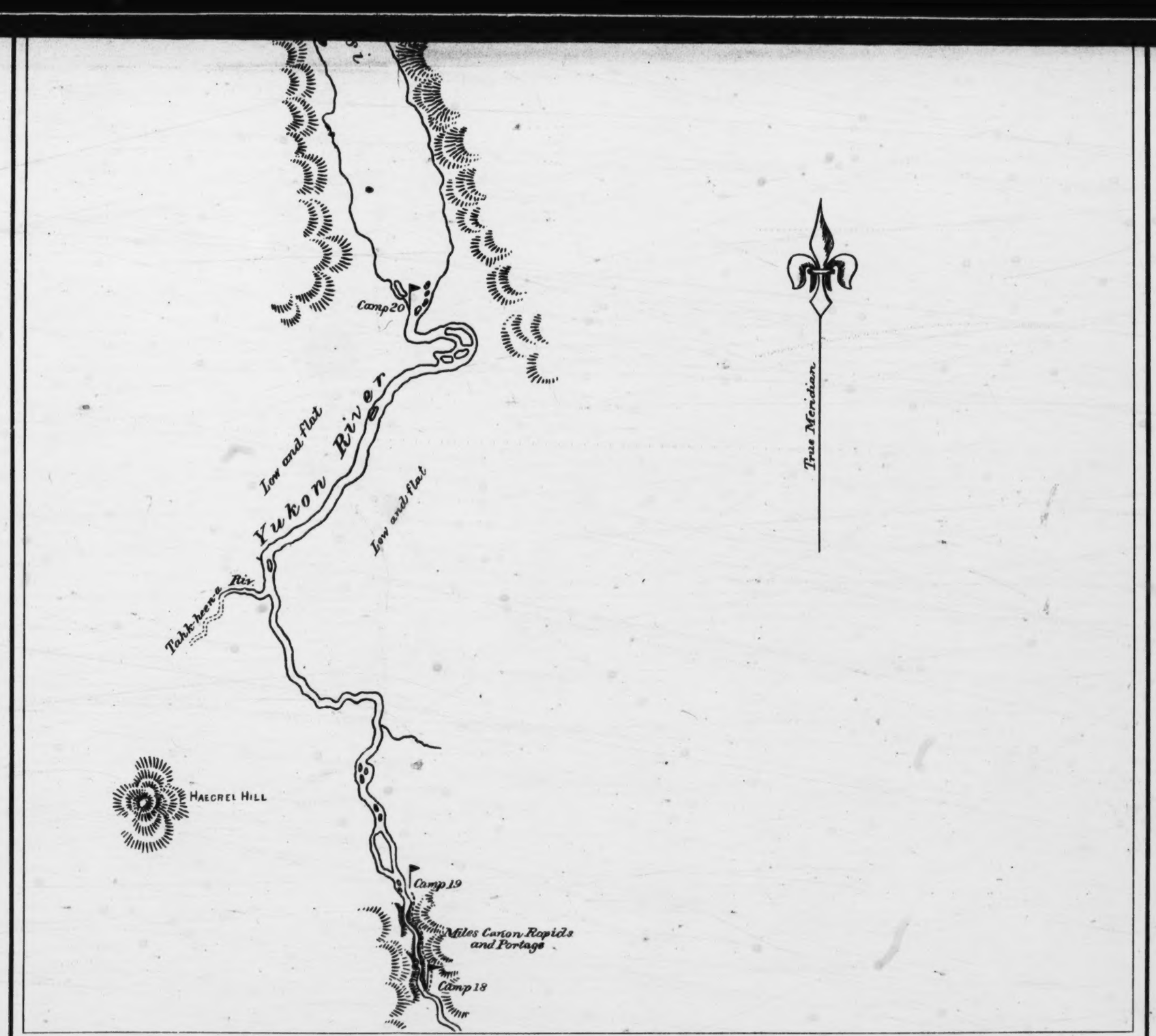
Early in the morning of July 1 we approached the great rapids of the Yukon and the only ones of importance in the navigable part of that great stream.

An inspection of them showed them to be nearly 5 miles long and extremely dangerous for any sort of a craft in going through them. The first three-quarters of a mile the stream narrowed to nearly one-tenth its preceding average width, rushes and boils through a canyon with upright basaltic columns for its sides, the center of this canyon, in its length, widening into a whirlpool basin where the water's edge could be reached on the western shore.

Fig. 12 is a view from the mouth of the canyon, about one-third the length of it. It then widens out into nearly its original breadth, but running swiftly over shoals, bars, and drifts of water-logged timber much more dangerous than the canyon itself for any sort of a navigable craft, though probably not so in appearance. I named this canyon (the only one on the Yukon River) and its appended rapids after the department commander, and it so appears on the maps submitted. Just before the rapids reach their termination the river bed again contracts and flows through basaltic columns from 15 to 20 feet high, and finally rushes through a narrow cascade with ascending banks, and so swift is the current and so narrow the chute that the water is forced

Sheet No. 3.

MAUNOIR BUTTE
(a conspicuous bald butte)
Camp 23
Camp 22
HANCOCK HILLS
WHITE BLUFF
Camp 21
Richtofen Rocks
(and probably river)
L a k e
(possibly
Lake Labarge)
K u w k-
t a s - s i


Camp 20
Low and flat
Yukon River
Low and flat
Tah-hee-e Riv.
Haegrel Hill
Camp 19
Miles Canon Rapids and Portage
Camp 18
True Meridian

up the banks on the sides and pours in sheets over these into the cascades below, making a perfect funnel formidable to behold.

Fig. 13 is a very imperfect photograph looking back (southward) at these cascades, an instantaneous view having been undertaken during very unfavorable weather.

Through the Miles Canyon and Rapids the raft was "shot" July 2, and although the side logs were torn off in a collision with the basaltic columns of the canyon, no further damage was done, and she was beached about half a mile below the cascades, where a couple of days were occupied in repairing the injury and putting on new decks from the fine, straight, and seasoned poles found in the vicinity.

Fine grayling were caught in large numbers in all the rapids near the canyon, and a considerable sized party could subsist on them if provided with proper tackle for securing them.

.On the 5th of July we got under way again, and a little after noon passed the mouth of the Tahk-heen-a, a stream about two-thirds the size of the Yukon, where they join. By it the Chilkats used to seek the Tahkheesh country for trading purposes, as already narrated, and yet return by it at times, as they say it is not obstructed by any rapids or cascades of considerable size, or that will compare with those of Miles Canyon. Its waters were very muddy, and while

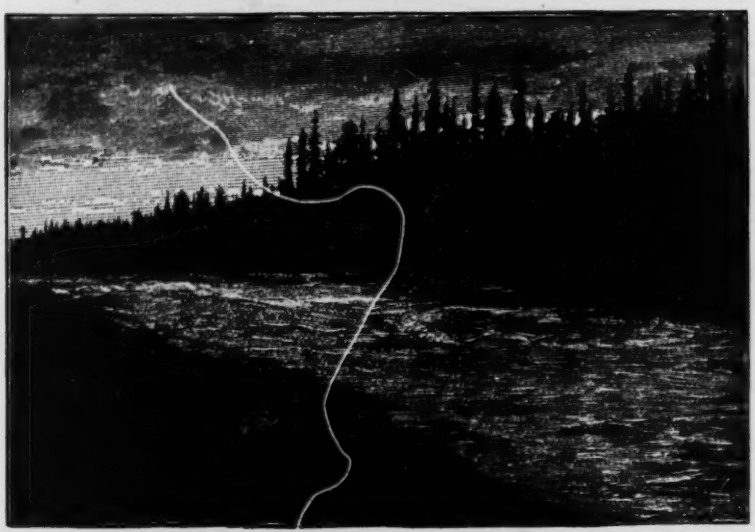


FIG. 13.

evidently smaller than the Yukon, the general characteristics of the valley of the Tahk-heen-a are continued on down the former stream. That evening, on the 5th, we camped on the head of the last lake (about 36 or 37 miles long), called Kluk-tas-si by the natives, and this name is still retained on the maps, although there is a lake called Labarge on Dall's maps, above old Fort Selkirk, which I can not identify by any of his topography, it being generally so erroneous. Except being a little larger in size, it resembles Lake Marsh, already described. Its eastern bank or shore is backed by large rolling and conspicuous rounded hills of gray limestone, the gullies between being wooded with spruce or pine, and forming a picturesque contrast with the light-colored hills. I named them after General Hancock, of the Army.

On the 9th we passed out of Kluk-tas-si, and when I desired to camp that evening I found the current so swift and the river so uniformly wide and canal-like that no eddy could be found to slacken the gait, and it was with difficulty that we secured the raft to the shore. In this part of the river we usually grounded once or twice a day on sand, mud, or gravel bars, and I think I have given them in the inverse order of the difficulty experienced in getting off them, sand being the worst and gravel the easiest from which the raft can be liberated. That day, the 9th, we passed the mouth of the Newberry River, coming in from the right (east), about 125 yards

wide at its mouth, and flowing a deep volume of clear but dark-colored water, evidently drainings from tundra land, or land in which the lower strata of winter-formed ice in the moist earth does not melt owing to its protection by the dense forests and deep moss, and consequently the water is surface-drained directly into the rivers and their tributaries after having been impreg-

FIG. 14.

nated with the dyes of the leaves and moss, which would have been lost could they have percolated through earth. A large grizzly or grizzly-colored brown bear was seen on the bluff marked with that name on the map, but we were unable to secure him.

Nearly 40 miles farther on another large river, the D'Abbadie, comes in from the east, and probably 150 to 175 yards wide at its mouth.

Another 40 miles and the Daly River, a little over 100 yards wide, comes in from the east.

FIG. 15.

Fifty miles beyond the Daly the Nördenskiold comes in from the west, and is probably 150 yards wide at its mouth.

With the accession of all these rivers the Yukon becomes over half a mile wide, and near the Nördenskiold becomes very tortuous, Tantalus Butte of the map being seen directly ahead of the

Rapids
Takehun R.
Kink Rapids

Sheet No. 4.

Camp 26

TANTALUS BUTTE

Nordenskjold R.
(Nor-den-skee-ald)

EAGLE NEST

Day R.

Camp 25

D'Abadie R.

SEMENOW MTS.

Camp 24

GRIZZLY BEAR BLUFF

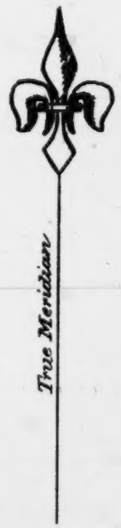
NEWBERRY R.

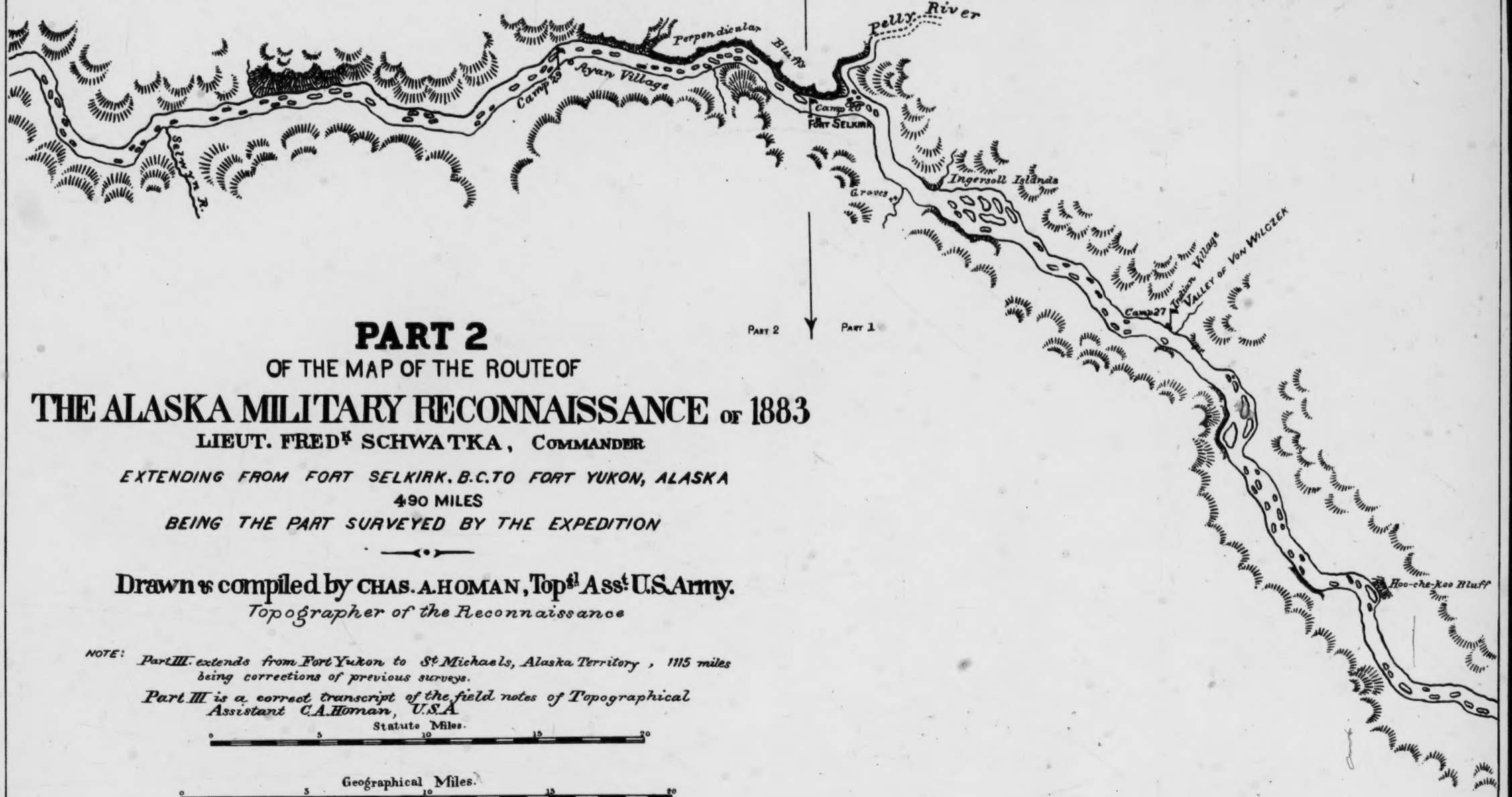
RED BUTTE

True Meridian

S Rep 1023 56 1

Sheet No. 5.





PART 2

OF THE MAP OF THE ROUTE OF

THE ALASKA MILITARY RECONNAISSANCE OF 1883

LIEUT. FRED^K SCHWATKA, COMMANDER

EXTENDING FROM FORT SELKIRK. B.C. TO FORT YUKON, ALASKA

490 MILES

BEING THE PART SURVEYED BY THE EXPEDITION

Drawn & compiled by CHAS. A. HOMAN, Top^l Ass^t U.S. Army.

Topographer of the Reconnaissance

NOTE: *Part III. extends from Fort Yukon to St Michaels, Alaska Territory, 1115 miles being corrections of previous surveys.*

Part III is a correct transcript of the field notes of Topographical Assistant C.A. Homan, U.S.A

Statute Miles.

0 5 10 15 20

Geographical Miles.

0 5 10 15 20

raft some six or seven times on as many different stretches of the river. Islands also become freely interspersed in its bed, and their upstream ends are often piled over with drift timber of all sorts in barricades from 5 or 10 to 20 feet high.

On the 12th of July we "shot" the last rapids of importance on the Yukon River (the Rink Rapids), and although the river is very much contracted at their site and pours in several channels through towers of rock, I think the eastern channel could be ascended by a light-draft steamboat with a powerful steam windlass, so favorable is the bank on this side of the stream, just above the rapids, for such an undertaking. If Rink Rapids can be ascended, then the cascades in Miles Rapids is the head of navigation on the Yukon, making this river navigable 1,866 miles from the Aphoon mouth, the only one that boats now enter or from which they depart.

The evening of the 12th we camped at the Indian village of Kitl-ah-gon, where the other house mentioned in a previous part of the report is to be found, the village being made up by brushwood houses, as shown in the photograph herewith given as fig. 14.

The house and village were deserted when we visited it.

Fig. 15 is a view looking up the Yukon from Kitl-ah-gon.

Fig. 16 is a view down the Yukon from Kitl-ah-gon. The view back into the valley of the small stream (Von Wilczek Valley) is also very picturesque and pretty, and is much more conspicuous than the valley of the Pelly, some 20 miles farther on.

From Kitl-ah-gon to the site of old Fort Selkirk the Yukon runs through a network of islands (Ingersoll Islands) so intricate that it was seldom that both banks were in sight from the

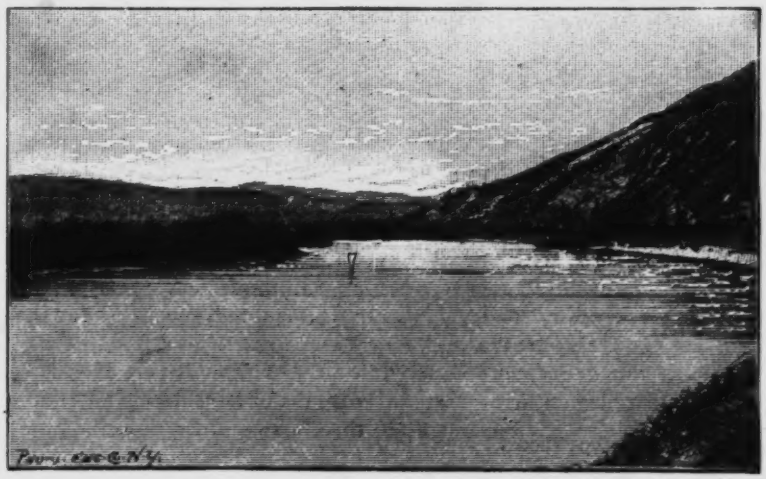


FIG. 16.

raft at the same time. In fig. 16 the lower ends of three and the center of one beyond are in sight.

July 13 the site of old Fort Selkirk was made out by the conspicuous chimneys that could be seen from the raft on the river, being a little below the junction with the Pelly and on the western or left-hand bank, despite the fact that all the maps in our possession placed it between the two rivers.

The fate of Fort Selkirk, a Hudson Bay trading post, has already been alluded to—burnt in 1851 by a party of Chilkat Indians because it interfered with their trade with the Tahk-heesh and other Indians. It has never been rebuilt, and its chimneys, three in number, are all that is left to mark the spot, and these are buried in a poplar grove that almost overtops them.

We remained near the site of the old fort until shortly after noon of the 15th, getting astronomical observations, which placed this site in latitude 62° 45′ 30″ N. and longitude 137° 22′ 45″ W. of Greenwich.

I had also determined to make close estimates on the relative sizes of the Pelly coming in

near this point from the east and the river down which we had just descended, and which was called the Lewis River by the old Hudson Bay traders, to see which was the Yukon proper, although a short inspection made it evident that no close measurements were needed, the Lewis River preponderating over the Pelly in width and volume of water, noticeably to the eye.

This position on my map is very important, although in a manner partially outside of my instructions, in that it marks the point where my explorations cease, and from the spot near Lake Lindeman where Dr. Krause turned back on his trail to old Fort Selkirk a distance of nearly 500 miles. Geographical science is under obligations to this reconnaissance, for mapping a region worse than unknown. I feel confident that these charts, submitted as a part of my report, although in no way claiming perfection, will render unnecessary any more minute surveys until some industry may open up this section, should that event ever come to pass. Fisheries

FIG. 17.

and minerals are the only possible incentives for such industries. Except the astronomical observations, the map work was in the hands of Mr. Homan, and the credit for the same belongs to him.

My investigations, reaching the whole length of the Yukon River, over 2,000 miles, were necessarily of such an extended nature, geographically, that I have deemed it proper to subdivide the same for convenience, and have done so into three parts, fully described on the appended itinerary of part 1.

Itinerary of part 1 of the map of the route of the Alaska military reconnaissance of 1883, Lieutenant Schwatka, U. S. A., commanding, from data compiled by Topographical Assistant Charles A. Homan, U. S. A., topographer of the reconnaissance.

Locality.	Statute miles.	Locality.	Statute Miles.
From Chilkoot Mission to mouth of Dayay River	16.1	From thence to north end of Lake Lindeman	5.8
From thence to head of canoe navigation on Dayay River.	9.9	From thence to south end of Lake Bennett, or length of Payer Portage (here Homan River comes in from the west)	1.2
From thence to mouth of Nourse River (west)	2.3	From thence to Prejevalsky Point (mouth of Wheaton River—west side)	18.1
From thence to Perrier Pass in Kotusk Mountains (4,100 feet)	11.0	From thence to Richards Rock (east side)	1.2
From thence to Crater Lake (head of Yukon)	0.6	From thence to north end of Lake Bennett (Watson Valley is drained by two rivers here, coming in from the west).	10.0
From thence to camp on Lake Lindeman	12.1		
[Length of Lake Lindeman, 10.1.]			
From thence to Cape Koldewey (Lake Lindeman)	3.7		

Itinerary of part 1 of the map of the route of the Alaska military reconnaissance of 1883, Lieutenant Schwatka, U. S. A., commanding, from data compiled by Topographical Assistant Charles A. Homan, U. S. A., topographer of the reconnaissance—Continued.

Locality.	Statute miles.	Locality.	Statute miles.
[Length of Lake Bennet, 29.3.]		[Length of Lake Kluk-tas-si, 36.5.]	
From thence to west end of Lake Nares (through river called Caribou Crossing)	1.7	From thence to Maunoir Butte (east)	16.2
From thence to east end of Lake Nares (or length of lake)	3.2	From thence to Red Butte (west)	3.2
From thence to Perthes Point (or length of Lake Bove, with bay, and possibly river coming in from south)	8.8	From thence to Grizzly Bear Banks (west)	9.4
From thence to mouth of Tah-ko River (south)	7.8	From thence to mouth of Newberry River (east)	8.9
From thence to north end of Lake Tah-ko	10.3	From thence to mouth of D'Abbadie River (east)	38.0
[Length of Lake Tah-ko, 18.1.]		From thence to mouth of Daly River (east)	41.6
From thence to south end of Lake Marsh (or length of connecting river)	9.1	From thence to Eagle's Nest Butte (east)	10.7
From thence to north end of Lake Marsh (or length of Lake Marsh, McClintock River coming in from east)	28.8	From thence to Nördenskjold River (west)	39.1
From thence to upper end of Miles Canyon on Yukon River	50.9	[Tantalus Butte is in this vicinity approached six or seven times.]	
From thence to length of Miles Canyon and rapids	4.6	From thence to Rink Rapids on the Yukon	25.4
[Head of navigation on Yukon.]		From thence to Hoot-che-koo Bluff (east)	25.8
From thence to mouth of Tahk-heen-a River (west)	23.1	From thence to Von Wilczek Valley (east)	17.0
From thence to north end of Lake Kluk-tas-si (possibly Lake Labarge)	17.8	From thence to Fort Selkirk (through archipelago called Ingersoll Islands) (west)	21.3
From thence to Richthofen Rocks (and probably river) (west side)	14.4	Total length of part 1 or the part explored and surveyed by reconnaissance[a]	358.8
From thence to north end of Lake Kluk-tas-si	22.1	Total length of raft journey on part 1 (from camp on Lake Lindeman to Fort Selkirk)	486.8
		Total length of raft journey on Yukon River, from Lake Lindeman to Nuklakayet (being the longest raft journey in the interest of geographical science)	1,306.2
		Total length of Yukon River	2,043.5

[a] Part 2 extends from Fort Selkirk to Fort Yukon, being the part surveyed by reconnaissance, having been explored by Mr. Campbell Hudson Bay Company. Part 3 extends from Fort Yukon to Aphoon mouth, being part explored by Glasunoff, Malakoff, Zagoskin, Kennicott, and Strachan Jones, and surveyed by Captain Raymond, U. S. A.

Therefore with the reaching of Fort Selkirk the account of Part 1 becomes complete.

Fig. 18 is a view of old Fort Selkirk, looking up the Yukon River, or southward.

Fig. 19 represents some of the fish caught near old Fort Selkirk, the smaller ones being the

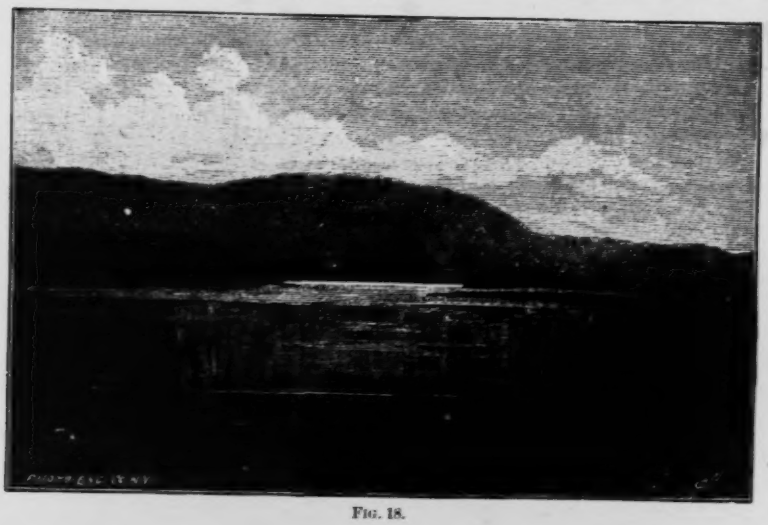


FIG. 18.

grayling caught in such immense numbers at Miles Cañon and Rapids, and the other a salmon trout, both being caught from Lake Bove to the mouth of White River, about 90 miles below Selkirk.

Fig. 20 is a view of an A-yan, or I-yan, Indian grave near old Fort Selkirk; the two poles with appendages are invariable parts of the graves of this part of the country.

Fig. 22 represents a number of A-yan, or I-yan, Indians in their birch-bark canoes. This view was taken at old Fort Selkirk, looking down the river, the Indians having come up to visit

FIG. 19.

us from their village, 12 miles below. Descending the Yukon, they are the first tribe to use the birch-bark canoe, a means of navigation that extends from here to the mouth.

Fig. 23 is a view down the Yukon River from the site of Selkirk.

The rafting party left Selkirk at 1.15 p. m. on the 15th of July, having waited past noon to get a meridian observation of the sun for latitude and a morning observation for longitude; the

FIG. 20.

days as far as particular hours were concerned being of but little importance, so light was it even up to 10 and 11 o'clock at night.

The half dozen A-yan Indians that had visited us at Selkirk spoke to us of a larger village a little below, but from the appearance of those we had seen on the Yukon River above we were in no way prepared to see such a large camp as we met on the southern bank at 4.15 p. m., numbering from 175 to 200 souls, and the largest either permanent, semipermanent, or temporary

that we met on the whole length of the river. It is of a semipermanent character. No doubt apprised of our approach by runners, the entire camp congregated on the river bank to meet us, and as the swift river threatened to sweep us by them without allowing us to make a landing, their excitement became intense, and their shouts and gestures to us, of the most lively character, plainly showed that they were extremely desirous of a closer acquaintance, evidently taking us

FIG. 21.

for a party of traders loaded with tea and tobacco, the two standard requests in all their many and constant solicitations. Camping near their village, an inspection of it showed it to be more squalid than we had expected from the bright, intelligent faces of the few we had seen and the superior workmanship of their light birch-bark canoes, the finest on the river. This village was wholly made of brush, and evidently only used for a summer camp while the salmon were to be

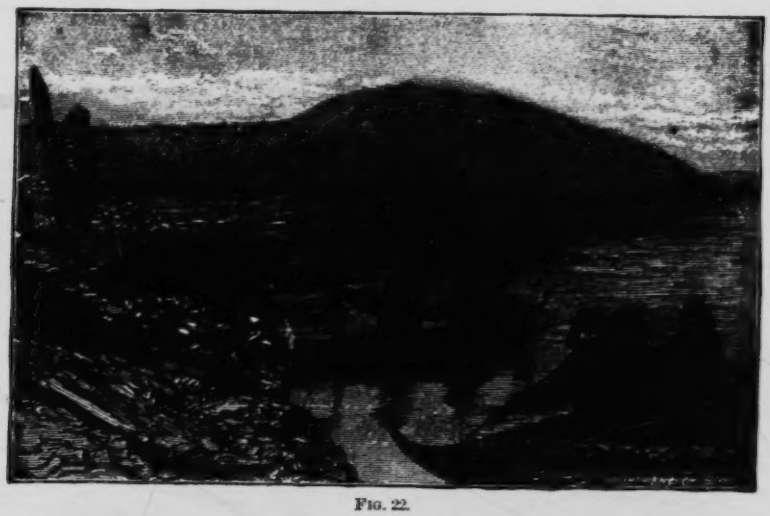


FIG. 22.

caught. The Hebrew cast of countenance was very noticeable in a great many of these Indians.

These Indians, in a military sense, are considered under the proper subhead.

Small black gnats now commenced getting noticeably numerous, and a mosquito bar was no protection from them.

The 16th we drifted 47 miles, a number of A-yan graves being seen on both banks of the

river, resembling, in general, the one photographed near Selkirk. In the afternoon the country became quite hilly and even mountainous, but the river bed still very full of islands, many of which are densely covered with tall spruce, looking very picturesque in the almost canyon-like river bottom, there being very few such large trees on the hillsides. During the day we saw a large black bear and three mountain goats on the hillsides, but our mode of navigation was not favorable for hunting them, and they were passed unmolested. We also ran through a number of recurring and disagreeable thunder showers in the afternoon, alternating with the most blistering heat, from which we could not escape while on the raft.

Very early on the morning of the 17th four A-yan Indians in as many canoes, from the village we left the morning before, came up with us, having left the village shortly after we had and having camped just above us during the night. We kept passing each other for the next three days, until Reliance trading station was reached, and judge from their movements and the opinion of our Indians that white men rafting and Indians canoeing on this part of the river are about the same in rapidity of traveling. The constant stopping of canoemen to hunt everything in the way of game, or at midday to cook a warm lunch, and remaining in their cramped posi-

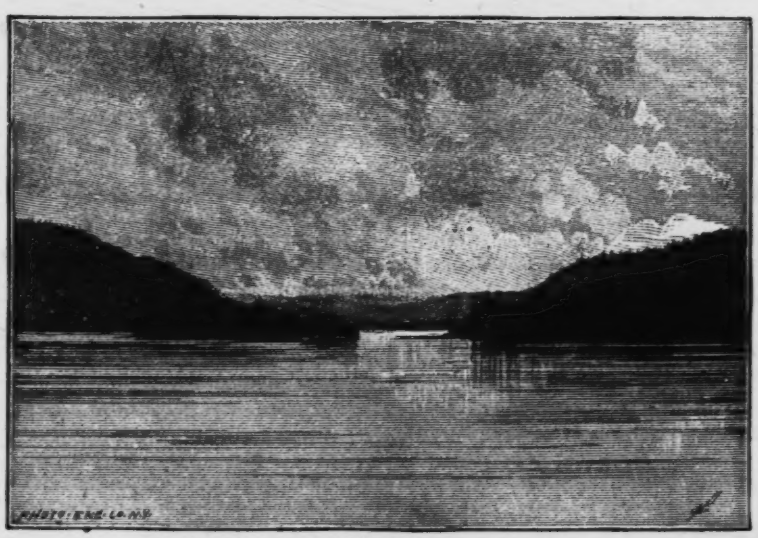


FIG. 23.

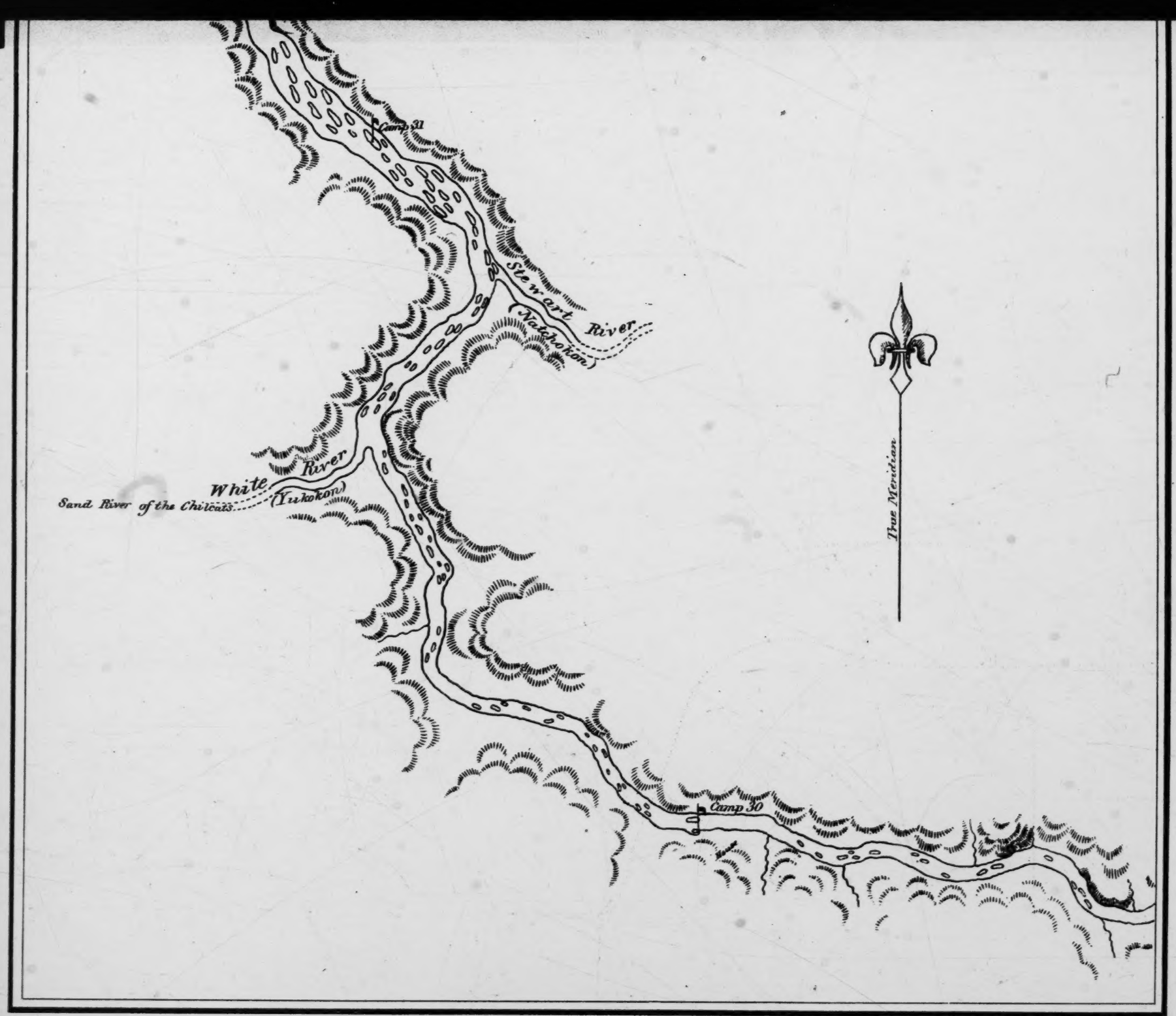
tions but for five or six hours per day, it is easy to see that it would no more than equal the steady drifting of a raft for twelve or fourteen hours if carefully kept in the stronger currents.

During the 17th a heavy fog hung over the river during the whole day, cutting the hillsides at an elevation of about 400 to 500 feet from the level of the stream. These fogs are very common on this part of the river during this time of the year, and are almost constantly present with the winds from the south, the prevailing ones of the summer. It is probable that they are caused by the supersaturated moist air from the warm Pacific being conveyed across the glacier-topped Coast Range of Alaska and thrown down into this part of the Yukon Valley in the shape of rain and fog.

At 1.30 p. m., the 17th, we passed the mouth of the White River coming in from the south, its waters seemingly liquid mud, from whence it probably derives its name. It is called by the "Sticks" the Yukokon Heenah (Yu-ko-kon) or Yukokon River, and by the Chilkats another name, meaning Sand River, from the immense number of sand bars and banks which they say exist along its course. Its waters mingle at once with the Yukon (although in Dall the contrary is erroneously stated), it emptying squarely into the latter with a current so swift as to pack its muddy waters nearly directly across to the opposite bank.

About 4 p. m. we passed the mouth of the Stewart River, its mouth so covered with islands

Sheet No. 6.


31
Stewart River
(Natchokon)
White River
(Yukokon)
Sand River of the Chilcats
Camp 30
True Meridian

Sheet No. 7.

Tatonduc R.
Boundary Butte
on Mt. Tatotlee
Thistlindu R.
Camp 35
Belle Isle
John's Village
Camp 34
Cave Rock

Rogruette Rock
Cone Hill R.
Camp 33
Chandindu R.
FORT RELIANCE
INDIAN VILLAGE
(Nactaco)
MOOSE SKIN MT
Camp 32
Deer River
True Meridian

that it was impossible to recognize it except by its valley, which was very conspicuous. Its mouth, however, is of a deltoid nature, but the many islands made their accurate establishment very uncertain.

On the 18th, 47½ miles were made from 8.30 in the morning to 9.40 p. m. At 1.30 we passed a number of Tahk-hong Indians on right bank, with sixteen canoes, who seemed to be much neater than any we had met so far. They were probably a trading party, there being one for each canoe and no women with them.

At 8.30 p. m. we passed an Indian camp on the left bank, which we at first took to be miners, as they apparently had such good tents, and from them ascertained that there was a white man's deserted store (of which we had heard several times, farther up the river, in a more or less definite manner) but a few miles farther on, but that he had left some time ago, going down to the salt water, as they say. That evening we camped at the mouth of a swift, fair-sized river, coming in from the east, which we afterwards ascertained of the traders to be Deer River, and is so marked on the map. Here the Yukon narrows to 200 to 250 yards in breadth and runs swiftly between high hills.

Believing I was near the British boundary, as shown by my Selkirk observations, I waited to get another set at this point, but the weather was so tempestuous that I only succeeded in a very imperfect way, and, not waiting for a noon observation, got away at 11.10 a. m.

Just before 1 o'clock in the afternoon we passed the abandoned trading post of the Alaska Commercial Company, Fort Reliance on the right bank of the river, and directly opposite was the semipermanent Indian village of Noo-klahk-o, numbering apparently 150 souls. Our approach was saluted by the firing of fifty to seventy-five discharges of guns, to which we replied by a much smaller number. I found this method of heralding to be universal from here to the mouth of the river, and, I understand, arises from a custom brought among them by the Russian traders, and that has slowly traveled inland at least as far as this point. These Indians are further described in the appendix.

Fort Reliance is a dilapidated looking place of two or three houses, a main store nailed up, and three others cellar-like and semi subterranean in character.

Less than 30 miles was made that day—the 19th—owing to our grounding on a gravel bar at the head of an island, where we were delayed over 2 hours, and finally had to "lighter" our effects ashore and camp in order to free the raft. Such occurrences were not rare.

On the 20th we started shortly after 8 in the morning, and at 11.30 a. m. passed the mouth of a large river coming in from the west, which I named the Cone Hill River, from a conspicuous conical hill in its valley near the mouth. Every one of the party that attempted it found it absolutely impossible to identify any incoming stream in this part of the river by the maps or descriptions now in existence. Just beyond Cone Hill River three or four bears, both black and brown, were seen on the side hills to our left, and about 300 to 400 yards distant, and although the most persistent firing was kept up by nearly the whole party until we floated out of sight, none of them were secured.

About 2.30 in the afternoon we passed a remarkably conspicuous rock, looming up out of a flat valley on the east side of the river, and closely resembling Castle Rock on the Columbia, although only about half the size of the latter. I gave it the name of Roquette Rock, as I saw no allusion to it on any map of this part of the river.

On the 21st, having started at 9 a. m., at 12.30 we came upon a small permanent Indian village on the left bank, of six houses and from 75 to 100 souls. About a mile and a quarter below, on the same side of the river, was a white man's abandoned trading house, near which we camped. From the Indians we learned that the trader's name was Mercer, and that he had gone down the Yukon. This station, we afterwards learned, had been called by the traders Belle Isle Station. (Fig. 25 is left out in the compiler's report.)

The Indian village is called Johnny's Village, and at the time of our visit the chief was away in a canoe. His English sobriquet of "Johnny" is the only one he is recognized by in his own country, though the Indian name of the village was Klat-ol-klin, and the Indians, as we under-

stood our interpreters, call themselves Tah-kong or Tahk-hong. A photograph of the village is shown in Fig. 26.

Further information concerning this small band is given in the appendix devoted to Indian tribes.

Fig. 27 is a view looking down the Yukon River from the village, about southwest. From

FIG. 26.

here to the mouth of the river it may be said to be equally luxuriant. Underneath it in many places there is a mossy or peat-like bed so tough that when the river undermines its banks in these places the turf holds on to that of the bank's crest, keeping it covered with a blanket of the moss. In wooded places, however, this falling in of the banks drags the turf with it into

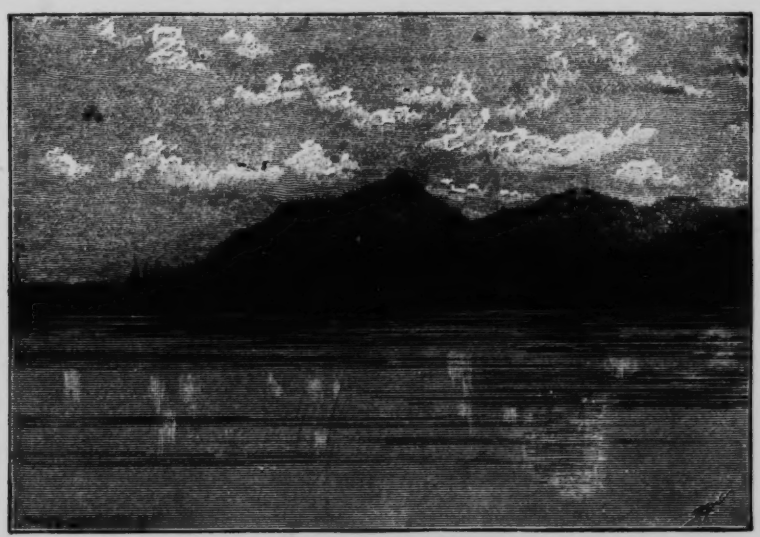


FIG. 27.

the water. Between camps 35 and 36 the soil, for the first time descending the river, seems to be thick and black, and continues so in a varying degree until the lower ramparts are again entered.

On the 23d of July we reached another Indian village, called Charley's Village, which is an exact counterpart of the one called Johnny's, even to number of houses (6) and side of the river (western) bank. We met a Canadian voyageur among them who calls them and Johnny's Village

True Meridian

Camp 37

CHARLIES VILLAGE

CATHUL M

Camp 36

S Rep 1023 56 1

the Tadoosh Indians, and says they are the most friendly and best-natured Indians on this part of the river.

After leaving camp 37 the country flattens out noticeably, and from about camp 38 to old Fort Yukon it spreads out over many miles in width (said to be 7 miles wide at Fort Yukon by a trader who was stationed there for several years) and so full of islands that it was about impossible to tell when we were near the main banks. Most wonderful of all in this wide extent of spreading, the current seems to slacken but very little in all the many intricate channels that were between, and evidently shows the deep character of the river before these numerous subdivisions commence and its shallowness afterwards, as no stream of importance helps to account for the relations between the two volumes in any other way. On the evening of the 24th we camped (No. 38) alongside of a small river steamer called the *St. Michaels*, which, during the spring freshet, while descending the river, had grounded on this bar, and being unable to get off was abandoned, her keel being now some 6 or 7 feet above the level of the present stage of water.

This boat belonged to the Western Fur and Trading Company, organized in San Francisco as an opposition to the Alaska Commercial Company, of the same city. They had recently been bought out by the latter company after having existed for several years at a loss to themselves. This opposition had some direct bearing on the Indian question in that during its prevalence

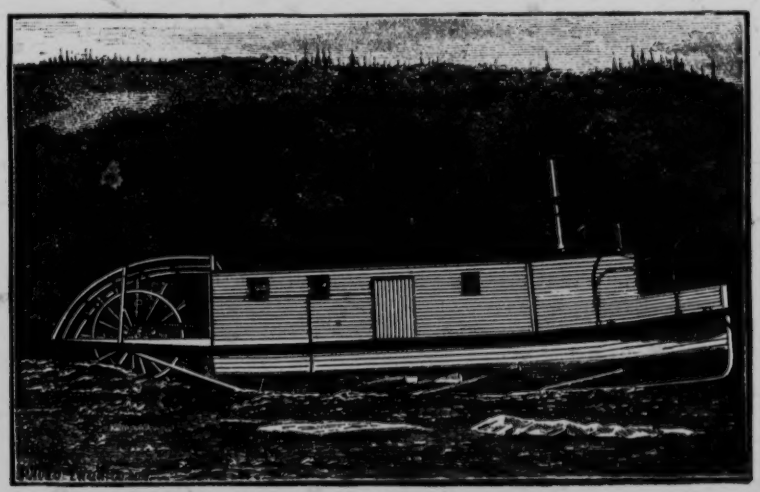


FIG. 28.

prices were put down to absurd figures, the Indians really getting for their furs, in some instances, more than they could have done probably in San Francisco itself. When this opposition ceased, although the former rates were not entirely resumed, a great step had been taken in that direction, and the consequence is a great majority of the Indians are dissatisfied with the present prices, as it is simply impossible for them to believe that the previous low rates were not remunerative to the companies, or that anyone would sell anything for less than it is worth, and consequently the present prices are exorbitant, and as Indians have but one way of correcting even mistakes, a sort of strained feeling exists in many places which could lead to more serious trouble. The traders on this river, however, are all men of good judgment, I believe, and this fact will make collisions less probable than would generally be supposed. Again, traders dependent upon Indians wholly for their trade do much more to conciliate them in all cases than any class of people with whom they can come in contact. If hostilities are threatened they will avoid them, knowing full well that if no blood is shed that the matter will be conciliated in a short while and they will be able to resume their trade, and that should such an unfortunate circumstance occur they would for years compromise all chances for such a desirable termination. This, coupled with the object traders have in keeping such ruptures hidden from both the public and other Indian tribes, has led to the well-known but erroneous opinion that the Hudson Bay

Company have succeeded so admirably in their contact with Indian tribes. If the Yukon River offers no field for industry but that which the Indian trader monoplizes, it might well be doubtful whether a military force would ever be needed along its course; but from the present prospects the salmon fisheries and mining may not be far distant, and men that enter these fields have no

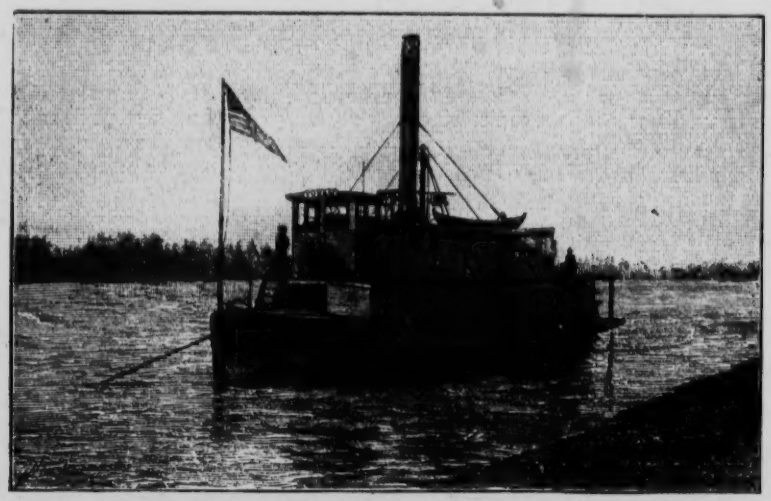


FIG. 29.

more consideration for Indians than any other class of people and will treat them as friends or enemies according to the way that they themselves may elect.

On the 27th of July we made old Fort Yukon about noon, the distance from the site of Fort Selkirk being 490.2 miles after correction by the astronomical observations, showing an error or correction of but 10.6 miles in the whole course, or .0212 per cent; or, more clearing speaking,

FIG. 30.

about 1 mile in 50, showing that the intermediate points determined by dead reckoning can be relied upon within that possible limit. Here we found the Alaska Commercial Company's river steamer *Yukon* on her annual trip up the river for trading purposes and supplying the posts of the company. These excursions were made as high as Belle Isle Station and Fort Reliance before they were abandoned, but are now made wholly with reference to where the Indians will be found.

Sheet No. 9.

Fort Yukon
Camp 41
Note. The river is said to be Seven miles wide at this point.
Camp 40
filled with Islands
low and flat
filled with Islands
Camp 39

low and flat

True Meridian

Camp 38
St Michaels Island

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Fig. 30 is a view of the interior of the old Fort Yukon stockade, nearly all of this part having been removed by the river steamer for fuel, it being handy and already cut in lengths. Two bastions are seen with the stockade between, and the two buildings in the foreground are the storehouse (nearest) and some of the officers' old quarters, both roofed with spruce bark held down by battens. The history of this Hudson Bay trading post is too well known to repeat here.

FIG. 31.

Passing into the hands of the Alaska Commercial Company, it was for a long time the farthest post they possessed up the great river until Reliance was established. Fort Yukon was abandoned three or four years ago as not remunerative, and Reliance and Belle Isle were then established, and these two were again abandoned recently (the former on account of expected Indian troubles

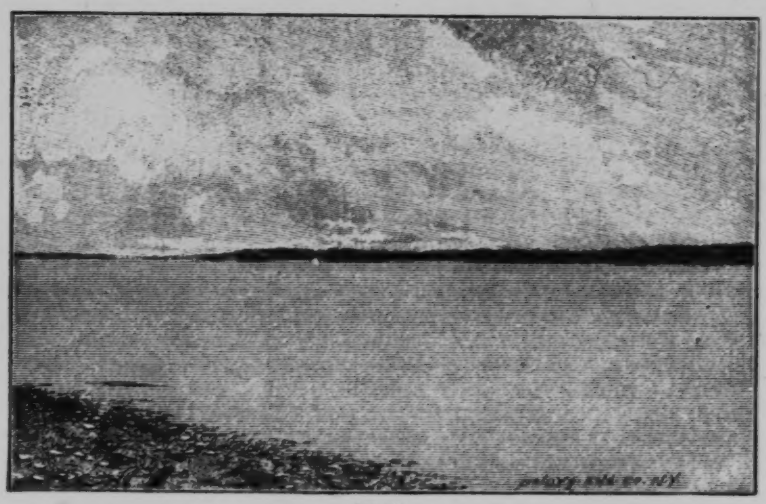


FIG. 32.

growing out of the opposition), and Nuklakayet, about 300 miles below Fort Yukon, is now their frontier trading station on the stream.

Fig. 31 is a portrait of Senatee, the chief of the Fort Yukon Indians, as they are called by the traders, and as I have named them in my description of the tribe. He is the only chief on the river having that power, as we generally understand it, among Indian tribes, all of the others, to a greater or less degree, having but nominal influence with their subchiefs and tribes.

I have spoken so much of the peculiarly flat character of the Yukon Valley for some 80 or 90 miles above old Fort Yukon that I give herewith a photograph (Fig. 32) looking southwestward across from the shore in front of the fort, giving clearly the easternmost channel, which is but one in several of greater or less width. Mr. McQuestin, who was for several years trader at the old fort, says that it is about 7 miles wide at this point, and he believes there are places on this flat part of the river where it may attain double that width. The following is the itinerary of the second part:

Itinerary of Part II of the map of the route of the Alaska military reconnaissance of 1883, Lieutenant Schwatka, U. S. A., commanding, from data compiled by Topographical Assistant C. A. Homan, U. S. A., topographer of the reconnaissance.

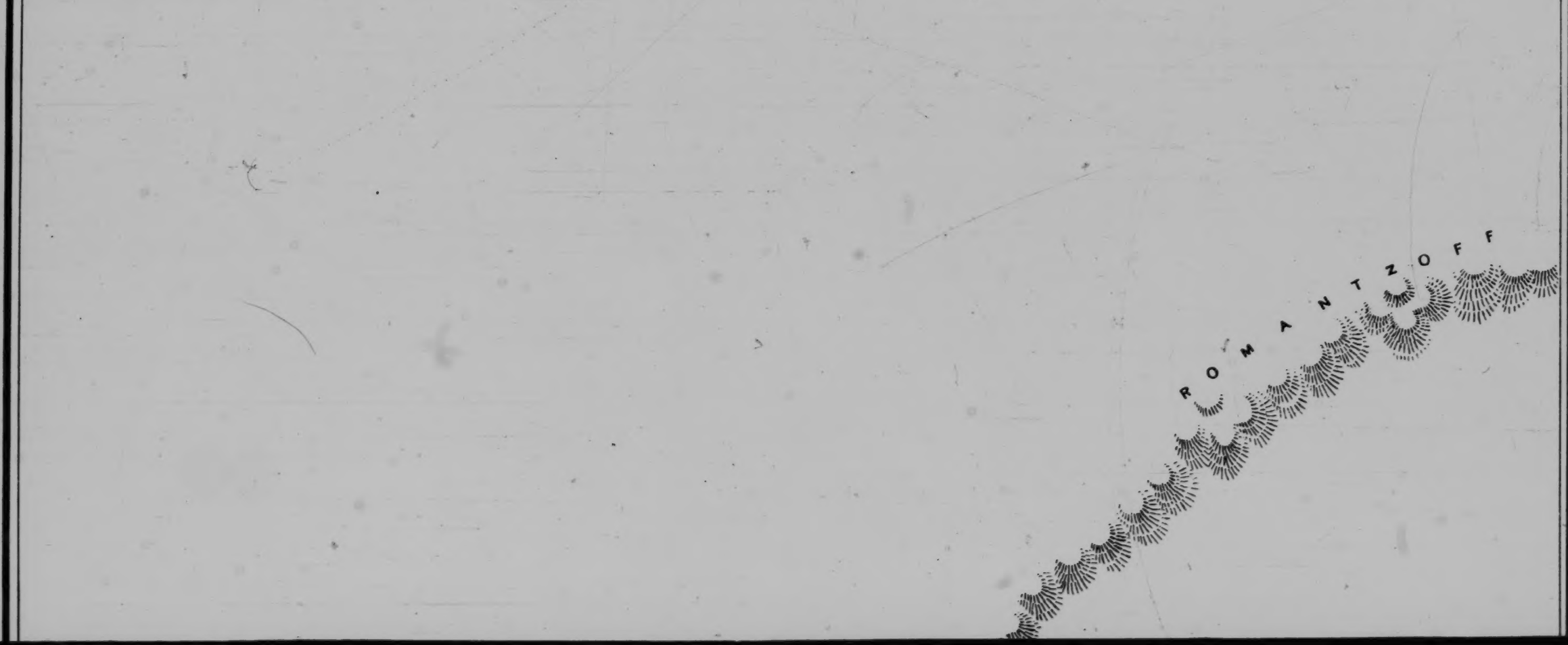
Locality.	Statute miles.	Locality.	Statute miles.
From Fort Selkirk, British Columbia, to mouth of Selwyn River	35.6	Thence to Belle Isle station	1.1
Thence to mouth of White River	62.1	Thence to boundary line 141° west *a*	20.3
Thence to mouth of Stewart River	9.7	Thence to mouth of Totondu River	10.0
Thence to mouth of Deer River	65.6	Thence to mouth of Tahkandik River	22.4
Thence to Fort Reliance	6.5	Thence to Charley Village	29.0
Thence to mouth of Chandindu River	12.0	Thence to St. Michael Island	47.4
Thence to mouth of Cone Hill River	27.5	Thence to Fort Yukon	97.0
Thence to Roquette Rock	13.0	From Fort Selkirk, British Columbia, to Fort Yukon, Alaska	490.2
Thence to Johns Village	33.0		

a Length of Yukon River in British America, 783.3; length of Yukon River in Alaska, 1,260.2.

Part I, or the part explored and surveyed by reconnoissance, 538.8.
Part III extends from Fort Yukon to Aphoon mouth, being the part explored by Glasunoff, Malakoff, Zagoskin, Kennicott, and Strachan Jones, and surveyed by Captain Raymond, U. S. A.

The party remained at old Fort Yukon during the 28th of July to determine rate and errors of chronometers, and on the 29th the journey was resumed, and between 7 a. m. and 8.45 p. m. drifted 50½ (geographical) miles, or over 4 statute miles per hour, plainly showing no diminution in the current despite the widespread character of the channel. At 11.30 a. m. we passed an Indian village of 5 or 6 tents, on one of the many islands in the channel, of probably 20 to 30 souls, although very few appeared, being probably absent hunting and fishing. On the beach were 7 or 8 birch-bark canoes, and lounging around was the usual high number of Indian dogs. This day, the 29th, was an exceedingly hot, blistering day on the river and almost unbearable on the raft, as we had no means of counteracting it on such a craft. To put up an awning of canvas was to seriously obstruct the view of the stern oarsman, who was responsible for the raft, and who needed this view to distinguish the swift from the slow currents, the sand, mud, and gravel bars where the vessel was likely to be delayed, and many and the worst of which were just under water even in the middle of the river; also snags, and landing places after camping hours. Again, an awning of canvas caught considerable wind, and if this was considerable and any other direction than fore and aft, steering was almost impossible. Here, within the limited part of the Yukon River in and near the arctic zone, our greatest discomforts were the blistering heat and dense swarms of gnats and mosquitoes that met us at every turn. The night of the 29th-30th but very few of the party slept well, owing to the gnats, the mosquito bars being no protection from the diminutive pests, and we consequently got an early start on the 30th, shortly after 6 in the morning, the day contrasting strangely with the one before. A cold and disagreeable wind with heavy clouds made the contrast, and gave us difficult work in steering clear of the lee banks, the small amount of bulky baggage on the raft forming a sufficient surface to the wind to determine this. The 30th the raft drifted 44 geographical miles in thirteen hours and ten minutes to camp 43 of the map. The wind had its compensating feature, however, in keeping away the mosquitoes and gnats at night, so that one could sleep.

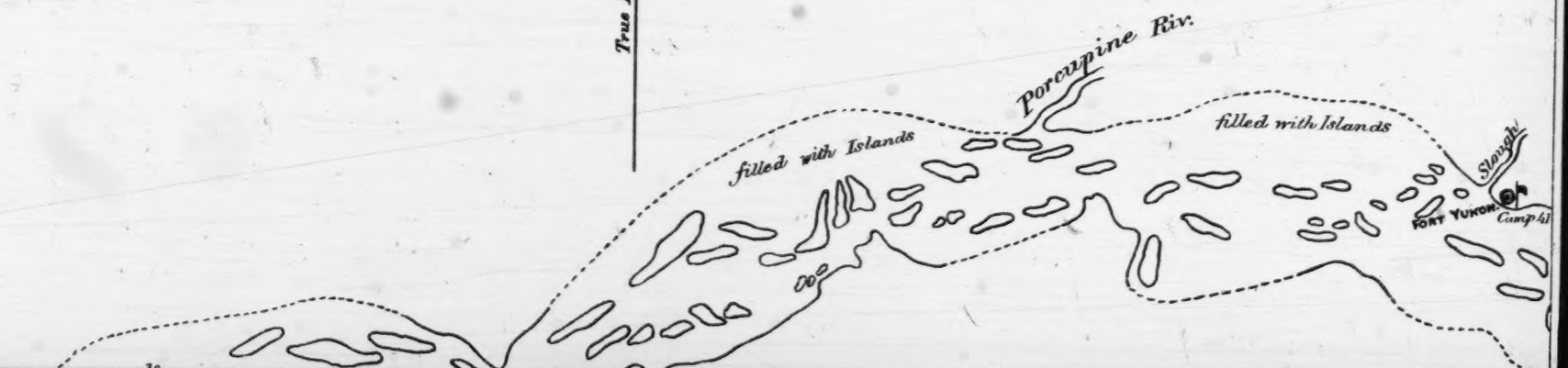
The 31st of July the raft drifted 45 miles in thirteen hours to camp 44 of the map, and that evening commenced raining so hard and so continued the next day, the 1st of August, that we remained in camp. The femur and molar tooth of a mastodon were found in the gravel bar near

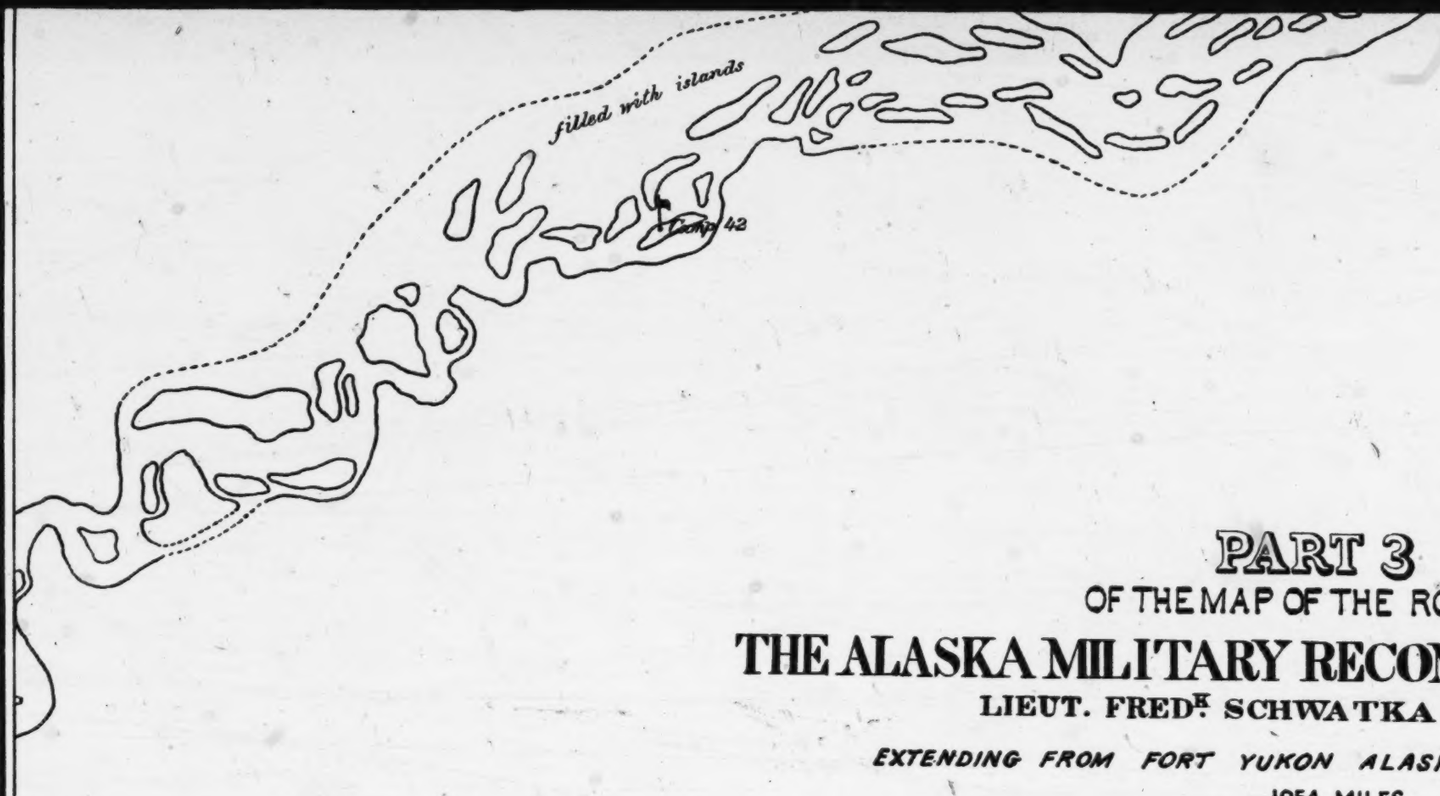

ROMANTZOFF

True Meridian
Camp 63
Camp 64
Potochangut or Dall R.
House

RANGE

True Meridian


Porcupine Riv.
filled with Islands
filled with Islands
Slough
FORT YUKON
Camp 41



PART 3

OF THE MAP OF THE ROUTE OF

THE ALASKA MILITARY RECONNAISSANCE OF 1883

LIEUT. FRED^K SCHWATKA, COMMANDER

EXTENDING FROM FORT YUKON ALASKA, TO APHOON MOUTH.

1054 MILES

BEING CORRECTIONS OF PREVIOUS SURVEYS

Drawn & compiled by CHAS. A. HOMAN, Top^l Ass^t U.S. Army.

Topographer of the Reconnaissance.

NOTE: *Part III is a correct transcript of the field notes of Topographical Assistant C.A. Homan, U.S.A.*

Statute Miles.

0 5 10 15 20

Geographical Miles.

0 5 10 15 20

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camp 44, the remains of these animals having been found in large numbers in the valley of the Yukon River, and especially this flat level portion of 300 miles extending between the upper and lower ramparts. At old Fort Yukon an Indian who showed us a tooth said that it came from a complete skeleton about two days' journey away that the river was exposing by undermining action.

The 2d of August we drifted but 26 miles in twelve hours, a strong wind keeping us against the left bank so as to impede our progress. We were forced into one slough by it that was so sluggish in current that, although but 2 miles long, we were over two hours drifting through. A number of such slack-water places were encountered that could easily have been avoided in less stormy weather. At 3 p. m. we passed a double log house on the right bank, with two or three small elevated log caches, peculiar from this point to the mouth of the river, two graves, etc., all of which seemed very new, although the place was deserted, very recently, however. Many signs of Indians were noticed as we approached the lower ramparts, as the hilly country is called. On camping at 7.30 p. m. we were but a short distance from the entrance to these hills, and it was with the greatest satisfaction that we approached them and left behind the flat country which we had traversed for 300 miles, and was tedious and irksome beyond measure in its monotonous flat scenery. In the whole length of this flat country there are but very few

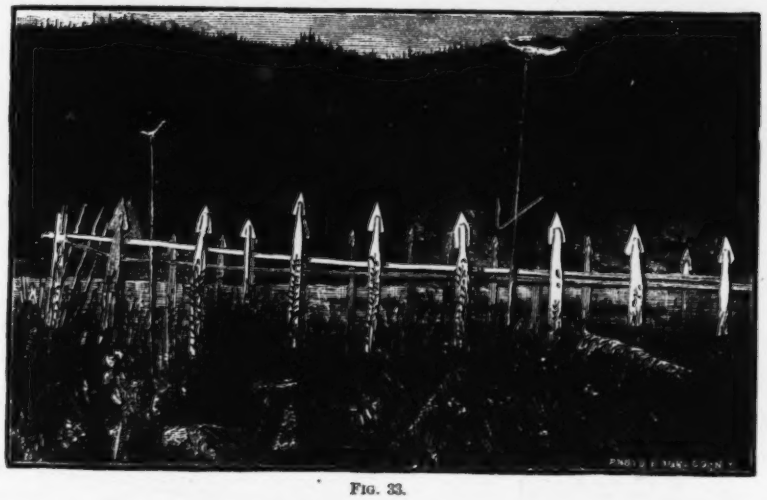


FIG. 33.

Indians, the mosquitoes driving the game out of its domain, and the innumerable number of wide shallow channels into which the river divides making fishing for them less certain than in the hilly districts. The establishment of Fort Yukon at the mouth of the Porcupine induced many to congregate around this spot, as is usual with frontier trading posts, and although it has been abandoned, a number still reside at the spot as a sort of trading point with the river steamer in its annual visits, and possibly the reluctance with which people abandon their homes of long standing despite their unfavorable positions.

On the 3d of August the raft was started at 7.30 a. m., and entered the ramparts shortly after. Through this part of the ramparts the country and river look very much like the Columbia River near the Cascades. A few Indians were now visible, and old and permanent signs of them quite numerous. About 6 p. m. we passed a well-built Indian house on right bank of the river, with log and stake steps up the steep river bank.

We camped at 8.30 p. m. near several Indian graves, about a mile or two above the mouth of the Whymper River (one of which graves is shown in fig. 33), where several had been buried during the raging of an epidemic some two or three years before. The fence around is the result of Christian influence, but their other superstitions can not be wholly overcome, as shown by the poles with the symbolic totems of geese, ducks, bears, etc., on their tops. The ramparts

on the third so closely resembled portions of the ramparts of the Middle Yukon between Selkirk and Belle Isle that the conviction seemed irresistible that they are identical chains stretched like a bowstring across the great arc of the Yukon, bending northward into the flat arctic tundra land. At camp 46 I found several varieties of berries, not only edible, but very acceptable, despite the general dwarfed and stunted condition of most of them.

The 4th of August we made 47 miles through the ramparts. At 7.50 a. m. we passed the concealed mouth (as going downstream) of the Whymper River coming in from the left. Through this part of the river between camps 46 and 47 were many signs of Indians, such as caches, old camping places, etc., along both banks, but singularly enough no Indians were visible, and the presence of wolves around these positions made me think that their absence had been for some little time. That day we had a most disagreeable gale of wind, hardly worth noticing except for the fact that, with the exception of a very few days, it continued unceasingly to the mouth of the river, and the observations of previous explorers and observers make certain the fact that such weather is the prevailing nature during the summer season. Many of the small creeks that put into this part of the river, and draining through the swampy tundra land, while so clear that their bottoms may be seen even in deep places (6 and 7 feet deep), are highly colored with a port-wine hue,

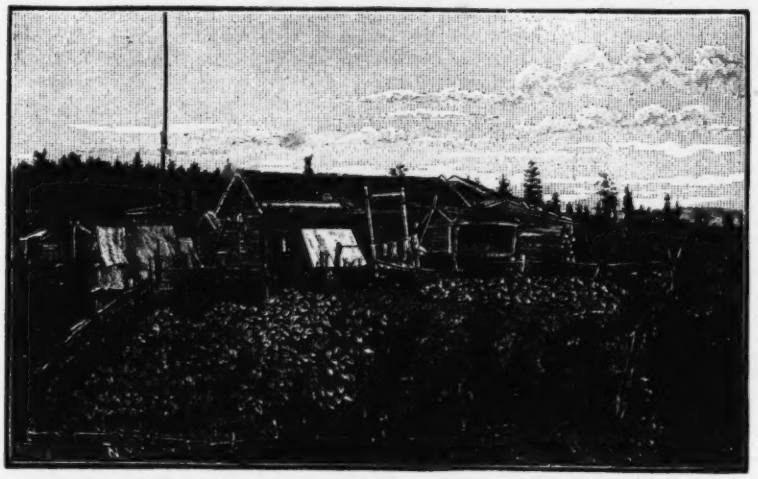


FIG. 34.

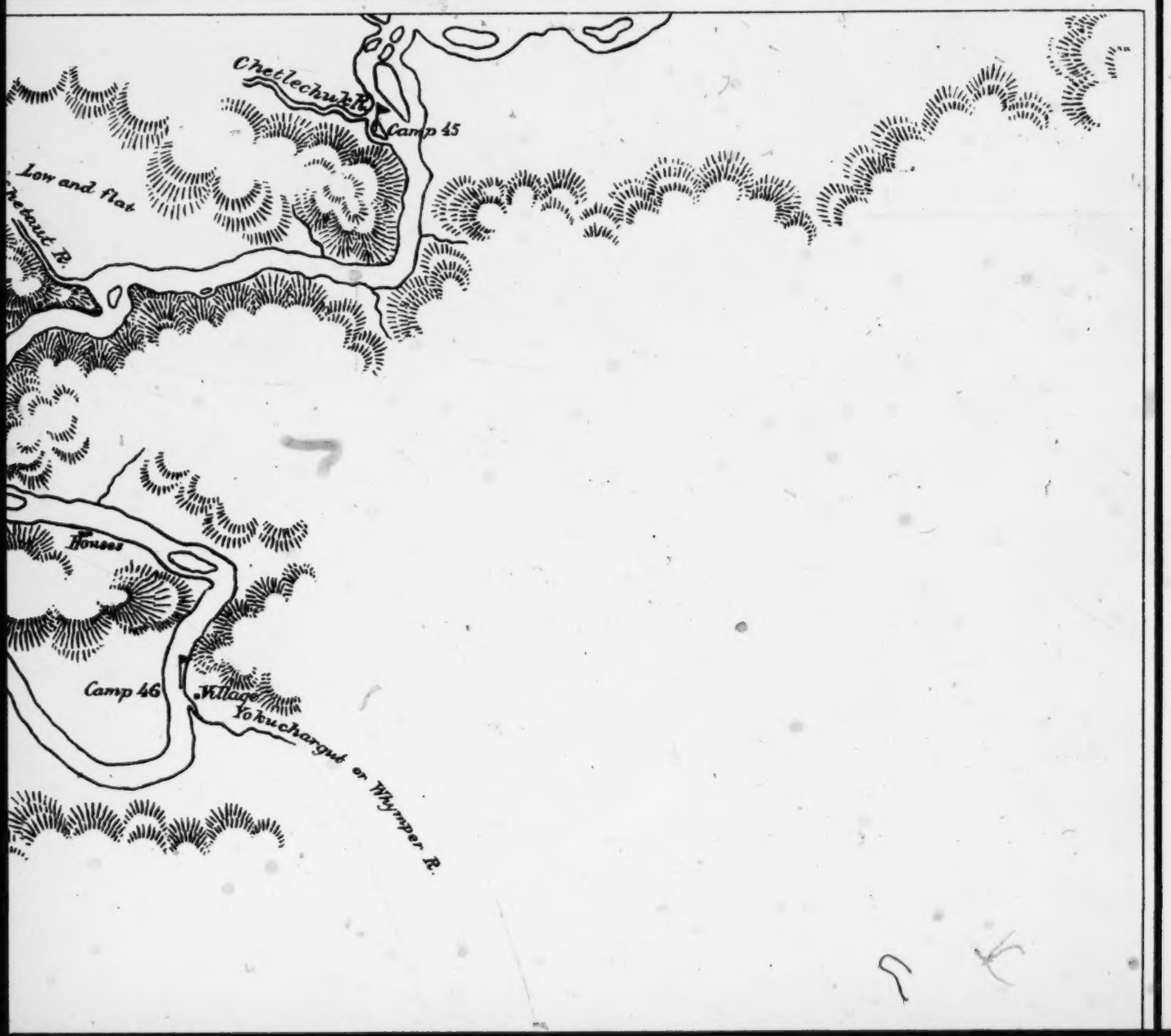
which contrasts strongly with the muddy waters of the Yukon, where they join. This may be caused by iron, as outcroppings of that character were seen.

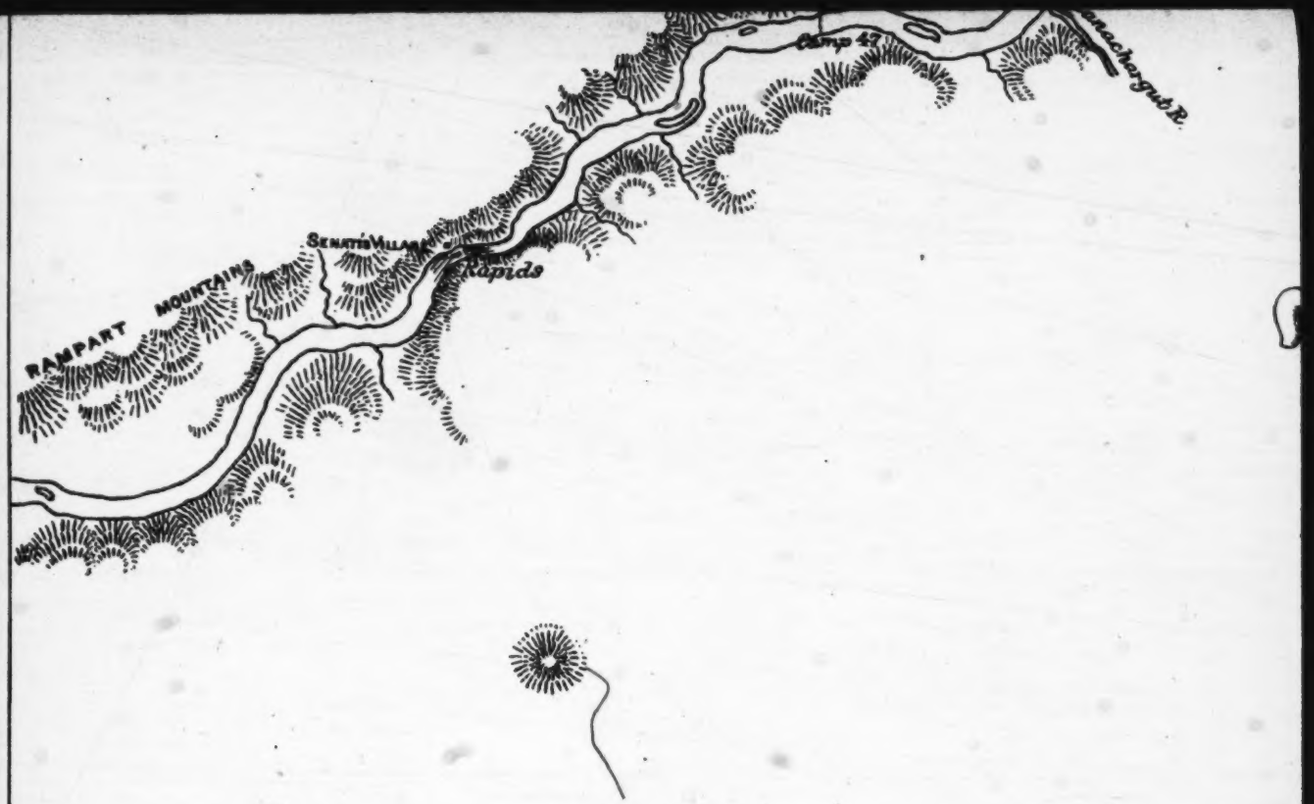
Twenty-seven miles were made next day, August 5, rain showers in the morning delaying our start until 8.55 a. m. At 2.10 p. m. we drifted past the spot known as "the rapids of the Yukon," being, until the present expedition surveyed the whole length of the river, known as the worst impediment on the river. We had been anxiously expecting them, and had some fears that they might prove disastrous to our rough means of navigation, but it was not until we were past them that we observed them at all, being represented by a bar of white bowlders around which the waters flowed as placidly as around any bar in the river. At high water the river may flow over this bar with some commotion, for it is here constricted into 300 or 400 yards in width, but during the greater part of the time navigation would be essayed it certainly is not worth considering.

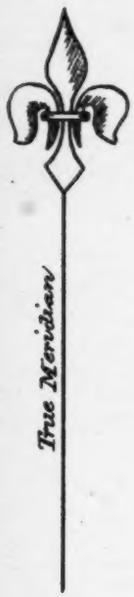
About half a mile below the rapids, on the right bank of the river, is the first considerable sized Indian village encountered after leaving the flat country described. It consisted of 2 tents and 4 birch-bark houses with from 40 to 50 souls. Eight canoes put off to meet us and fresh salmon were procured from them, the first we had had for several days. This part of the Yukon River is quite picturesque, equal to that for 100 or 200 miles below the site of old Fort Selkirk, and superior in grand outline to any scenery from here to its mouth.

Camp 47

Sheet No. 12.


Chetlechuk R.
Camp 45
Low and flat
Houses
Camp 46
Village
Yokuchargut or Whymper R.


Camp 47
Senatus Village
Rapids
RAMPART MOUNTAINS


True Meridian

MESQUATILLA MTS
Village

Sheet. No. 13.

Camp 50

Flat

True Meridian

S Rep 1023 56 1

On Monday, the 6th of August, having started at 8.30 a. m., at 6.10 p. m. we made Nuklakayet, the farthest outlying trading station of the Alaska Commercial Company on the Yukon River, and were glad enough to meet permanent civilization, and part with our raft, on which we had navigated the river for over 1,300 miles. Nuklakayet station was in charge of Mr.

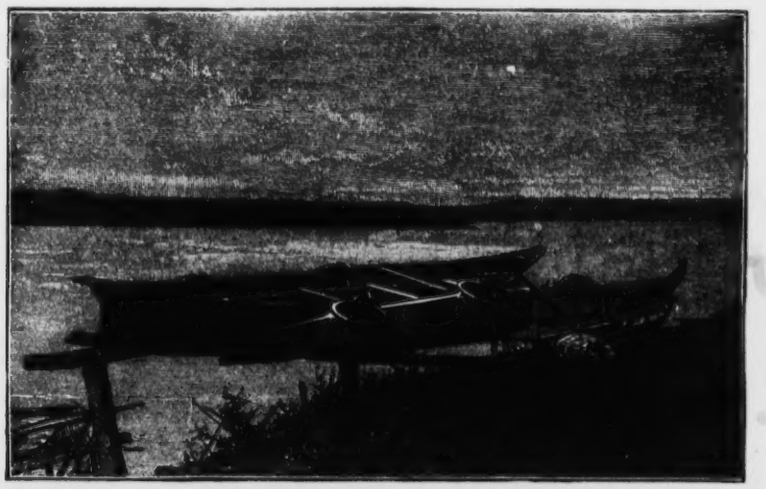


FIG. 35.

Harper, an old employee in these regions, and, like all such, seemingly content with his isolated lot. A small garden was attached to his station on a bank with a southern exposure and good drainage, and here he cultivated the rougher varieties of hardy vegetables. Turnips were

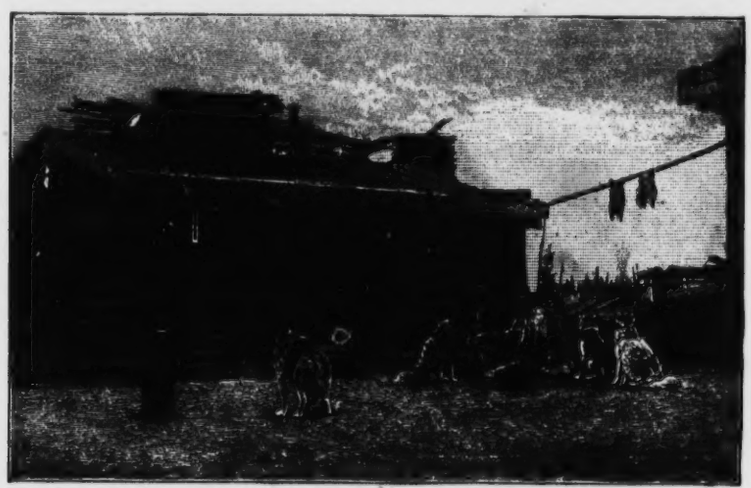


FIG. 36.

grown that weighed 6½ pounds, and other varieties of vegetables were equally surprising, considering the high latitude, within less than 100 miles of the polar circle.

Fig. 34 is a view of Mr. Harper's trading station looking westward, with the little garden in the foreground.

It is typical of the fact that when fisheries line this great river, as they are sure to do, and mining camps dot its tributaries, as indications show they may, that with such rough vegetables as may be grown and such varieties as will bear transportation, that life may be made more bearable than one would think from its extreme isolation.

Fig. 35 is a view of the means of transportation used in this part of Alaska both in summer and winter, the two boats explaining themselves by the figures, while in the foreground is the usual sledge of this part of the Yukon Valley to its mouth. At this point also commences the Eskimo dogs used with the sledges, all those previous being of the Indian variety, a smaller but I believe a hardier variety.

Fig. 36 is a view of a group of these dogs, there being over 50 at this station, having been collected by Mr. Ed. Schieffelin, a mining capitalist prospecting on the river, for his winter's use in sledging.

The subject of procuring sufficient food for so large a force of animals was a serious one, and Mr. Harper informed me that he expected to kill a number before winter. Their sustenance is wholly dried salmon, for which the white traders pay 1 cent apiece in trade. Among these fish so furnished is found the king salmon, the variety well known as the best for general canning purposes.

Fig. 37 is one taken of the raft at the point where it was abandoned. At Nuklakayet we obtained a 12-ton "barka" (as it is called by the traders of the river), which is really but a small decked schooner of that capacity. There were no sails except a small flying jib, and it was my intention to float down the river with the current as I had with the raft, except such small aid as

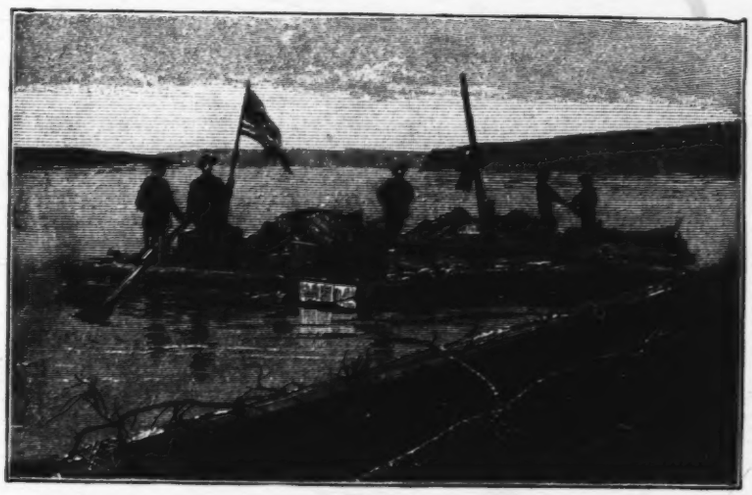


FIG. 37.

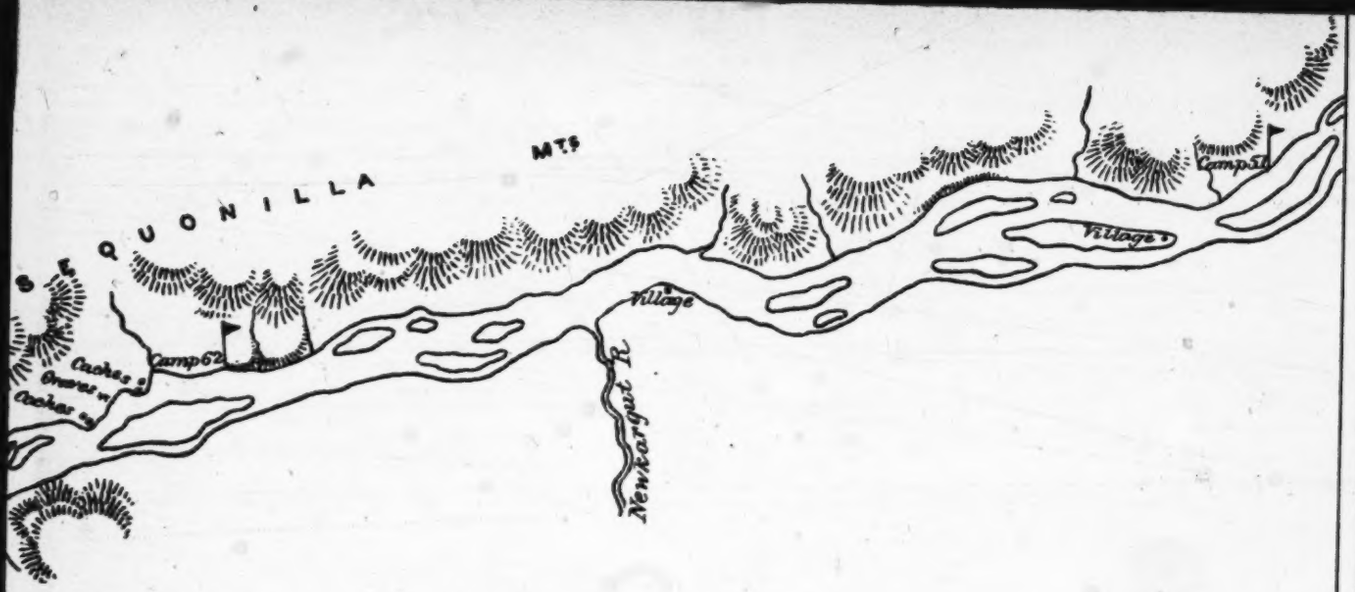
I might get from the jib when the wind should be favorable. I might here add, however, that the usual wind was from the general direction we desired to go, and, as already stated, of a steady tempestuous character.

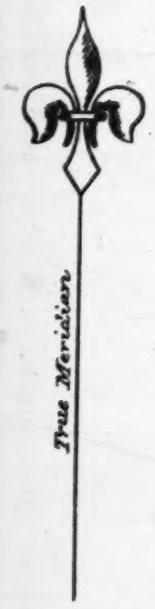
We remained over at Nuklakayet the 7th of August, transferring from the raft to the barka and preparing the latter for her drift.

The 8th the voyage was resumed, and made 37 miles by drifts, being aided on occasional bends of the river by the jib. Private Roth of the party was a good sailor, and his services were in much demand in this hybrid system of navigation. We found it much harder to get near shore in the barka so as to go into camp than it had been on the raft. It was also much more cramped, but in compensation for this we could keep dry during the rainy weather and to a great extent protect our more valuable property from the same, and we certainly needed this protection, for the weather during the rest of the month was the most continuously bad of any summer weather I have ever experienced. Mosquitoes were still very numerous, and we were either getting so used to them that they appeared so or they were really less aggravating than on the upper half or two-thirds of the river.

Starting early on the 9th with a light wind in our face we had just reached a wide open part

Camp 33
Yahoohargui R.
Meloxechargui R.
Grosses Nouses R.





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of the river, not over a mile from camp, when this breeze increased to a gale, with white-capped waves 3 or 4 feet high, and so strong as to hold the barka almost at a standstill even in this strong current. We were compelled to run for an anchorage, and here remained until 4 p. m., when we drifted some 7 or 8 miles, the wind dying to a calm, and the mosquitoes consequently as numerous as ever. I found that day that the barka turned broadside to a head wind drifted much faster than when head or stern on, and this fact afterwards saved us many miles in our navigation. I afterwards ascertained that the traders on the river secured this without effort by suspending a heavy anchor or large bucket or basket of stones from the sprit so as to hang in the water. We secured the same result by constant work at the stern oar, aided by the hatchways used as sails near the stern.

The 8th and 9th we passed very few Indian indications, and in general it may be well to remark that for some distance on either side of a trading station the Indians seldom are very numerous, being more so at the station itself and at the remotest points from them.

The 10th was a repetition of running ashore and poling off, as the wind came up or died down. About a mile below camp 51 we passed an Indian village of log houses and tents on the north bank, holding probably 50 to 60, there being a large fish weir or trap on the head of the island directly opposite. These Indians, even after many years' intercourse with the Russians

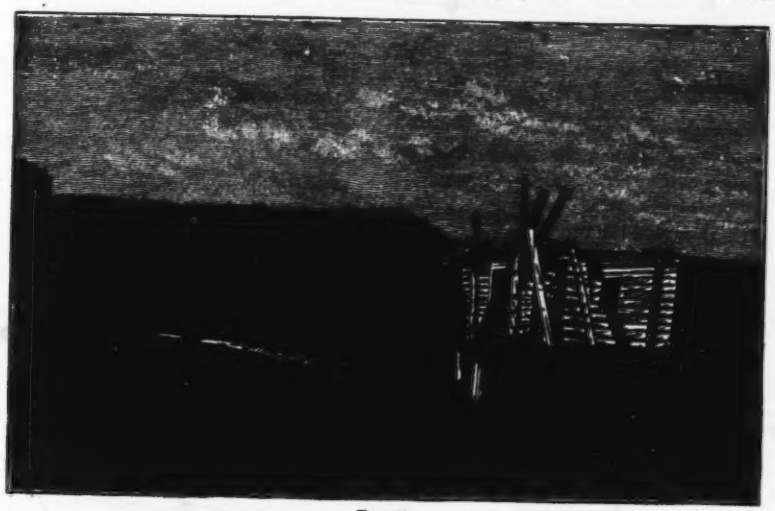


FIG. 38.

previous to our possession of the country, seem to know nothing of the method of catching salmon by gill nets and the ease and rapidity of the same. Again, about 2 o'clock in the afternoon, another village of about the same size was met on the head of one of the numerous islands, engaged, as before, in fishing.

On the 11th we drifted to camp 53, the weather disagreeable in the extreme, and but few Indian locations being noticed.

On the night of the 11th–12th a small river steamer came to our camp, having put up below a few miles and then steamed up to our position, upon hearing of our presence. It proved to be a small river boat built by the Scheiffelin party of miners, and as they were leaving the country, it had been purchased by three of the traders of the Alaska Commercial Company, who had become dissatisfied with their treatment by that company and were proposing to start a trading company of their own. It is called the *New Racket*, and, with the *Yukon* and *St. Michaels*, forms the entire steam fleet on the river. The latter is, however, comparatively worthless.

All day on the 12th we were passing Indian villages, houses, graves, encampments, etc., probably representing 250 to 300 or 400 people, the greater majority of whom seemed indisposed to stir, owing to the inclement weather. At 3.30 we passed the Indian village of Sakadelontin of the map. It was preceded by a number of coffins in trees, the first of this character seen

on the river. Heavy, gloomy weather prevented photographs on a most interesting part of the river.

On the 13th we passed the mouth of the Koyukuk, the largest northern tributary of the Yukon River, I believe, although little or nothing is known any great distance beyond its mouth. The Indians on its shores have the worst reputation of any from Fort Yukon to its mouth, but as they have uniformly brought vast numbers of furs to the nearest trading posts, the traders have been perfectly willing to leave their country unexplored, and allow them an unmolested possession. Some of the outrages of the Koyukuks are spoken of more in detail in the subject of Indians. I do not believe, however, that they would resist a force of 20 or 25 well-armed men attempting to explore and investigate their country.

The night of the 13th–14th raged one of the severest gales we encountered on the river.

The 14th we reached Nulato, a point of considerable importance with reference to the history of the old Russian Fur Company, it being their farthest outlying permanent trading station on the Yukon River. It has been the scene of a number of massacres and murders spoken of under the head of Koyukuk Indians, and at the date of our visit was abandoned, owing to a murder of a Russian trader that had occurred some two or three years before, and that had unsettled the peaceful relations between the whites and natives. Nulato shows much finer construction in its buildings, erected by the whites, than any encountered on the river so far, but they were rapidly being torn to pieces by the natives since their abandonment.

The 15th of August we left Nulato. On the same side of the river, and about a mile below this point, is a large permanent Indian village of about 25 or 30 houses and caches, and inhabited by probably 60 to 100 people when the trading stores were running, but now nearly deserted. A number of Indian villages were passed during the day in making camp 57, but most of them seemed thinly populated. The despicable weather, the removal of the trading stores, and the hunting season, may all be charged with this apparent discrepancy between houses and people. From about this general section of the river to its mouth the influence of Bering Sea, and even the Pacific Ocean, commences to be felt. The ground does not freeze to such great depth, and in many places, especially southern exposures, the thawing of the summer is equal to the depth of frost in winter, which insures partial drainage, and the tundra land, though still existing, becomes less marshy and impassable to walking, and travel into the interior becomes possible. From the Koyukuk band, already spoken of, on down the stream Indians are found who make annual inland hunts in summer time to secure reindeer and other game, instead of remaining religiously on the river, as may be said to be the case above these points in that season.

From near Kaltag to the mouth there is no high land on the southern bank, except that that can be seen in the distance in the way of low, isolated peaks and short mountain ranges, while, with the exception of a few short stretches at the mouth of a small creek, the land on the north bank was high and often precipitous even to the water's edge. I think it not improbable that Kaltag was an ancient mouth of the Yukon, and it has since filled in the shallow shores to the present delta. So shallow is Bering Sea on its eastern or Alaskan shores that the débris and sediment of the Yukon have formed outlying shoals for a distance of nearly 100 miles from the beach, and across these shoals of sand and mud no vessel of even the lightest draft can pass with safety. During storms of any intensity the water lashes up the mud from the bottom so near, and this serves as a useful warning to vessels when most needed. It is this fact which has forced the port of the Yukon River nearly 100 miles to the north in Norton Sound (Fort St. Michael), where vessels of reasonable tonnage can have ready access, and to reach this they pass in and out of the Aphoon, or northern mouth. I believe, however, that a much better port could be found somewhere on the Kusiloak or main mouth of the river, which has never been given a proper hydrographic and topographical survey.

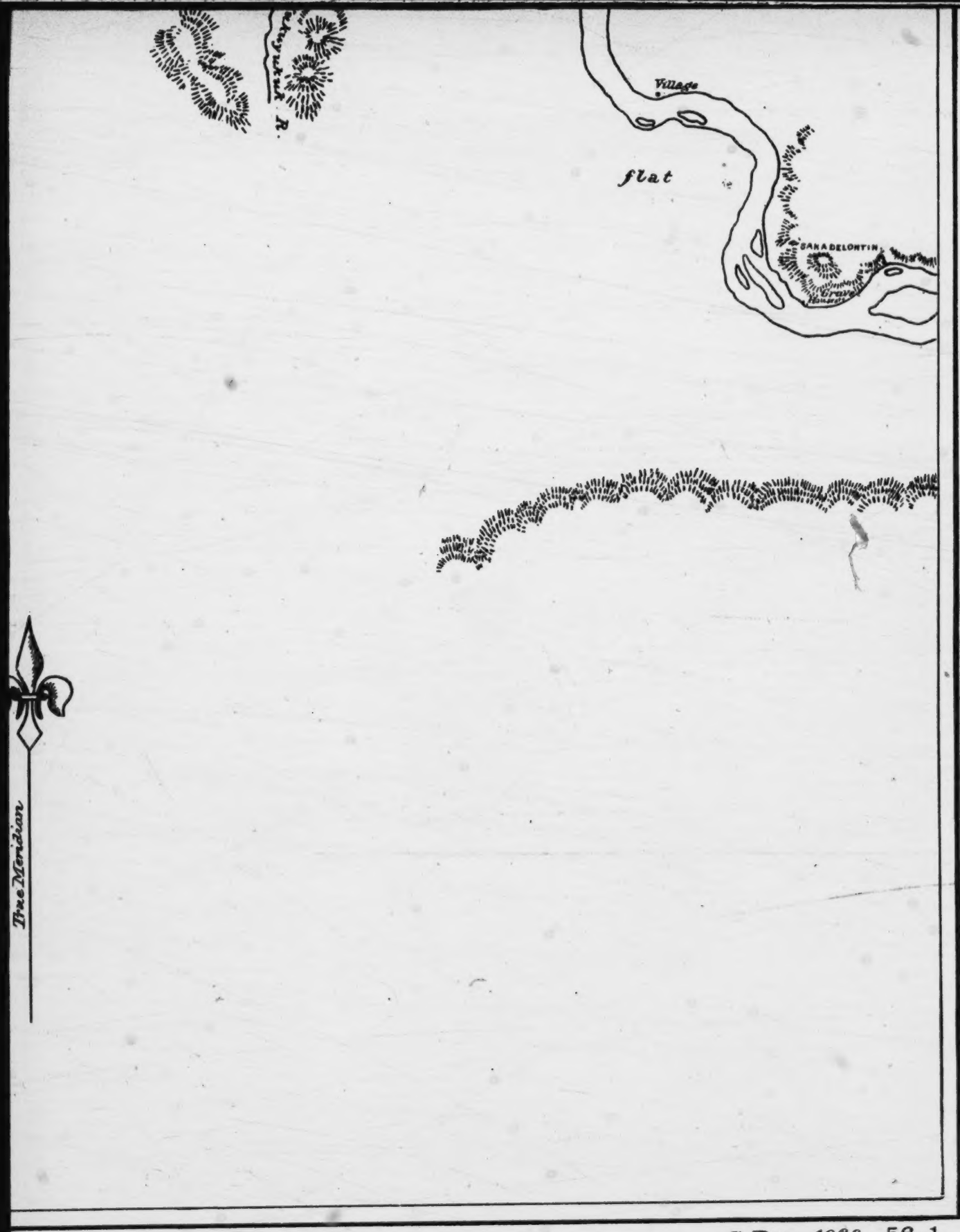
The 16th of August the wind and rain were so strong from ahead that I remained over, being at a point on the river where the whole channel was in sight, obstructed by no islands, and which I might mention as being an unusual occurrence.

My object in camping at such a point was to watch for the river steamer *Yukon* to take the barka in tow, she being unable to proceed out to sea, having, as already stated, no sails.

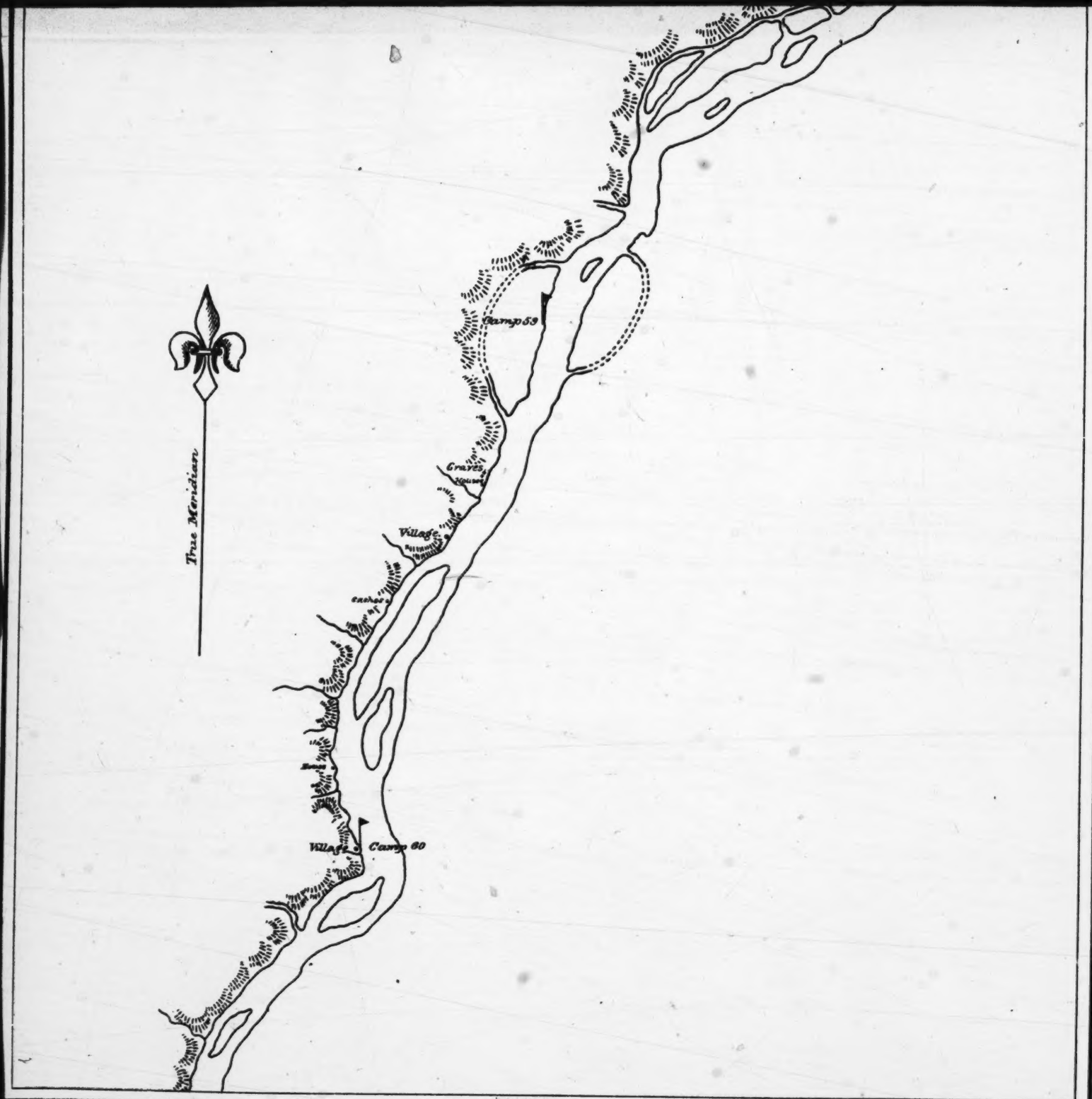
NULATO
Camp 55

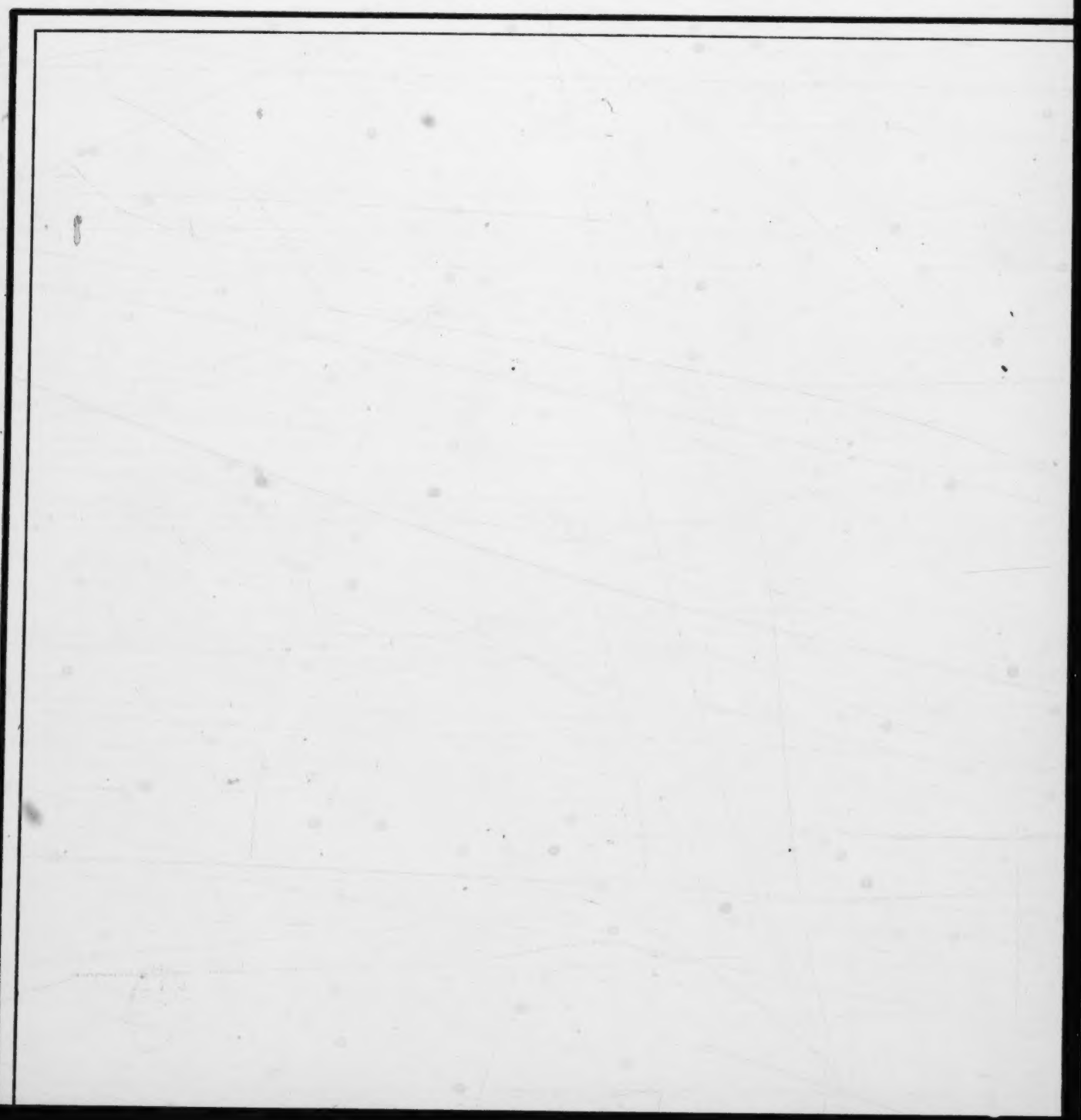
Sheet No. 15.

Village
Village
Village
Village
SHAMAN MT
Tom's Village
Village
Kahltag
Camp 57
Graves
caches
True Meridian


Village
flat
SARA BELONTIN
True Meridian

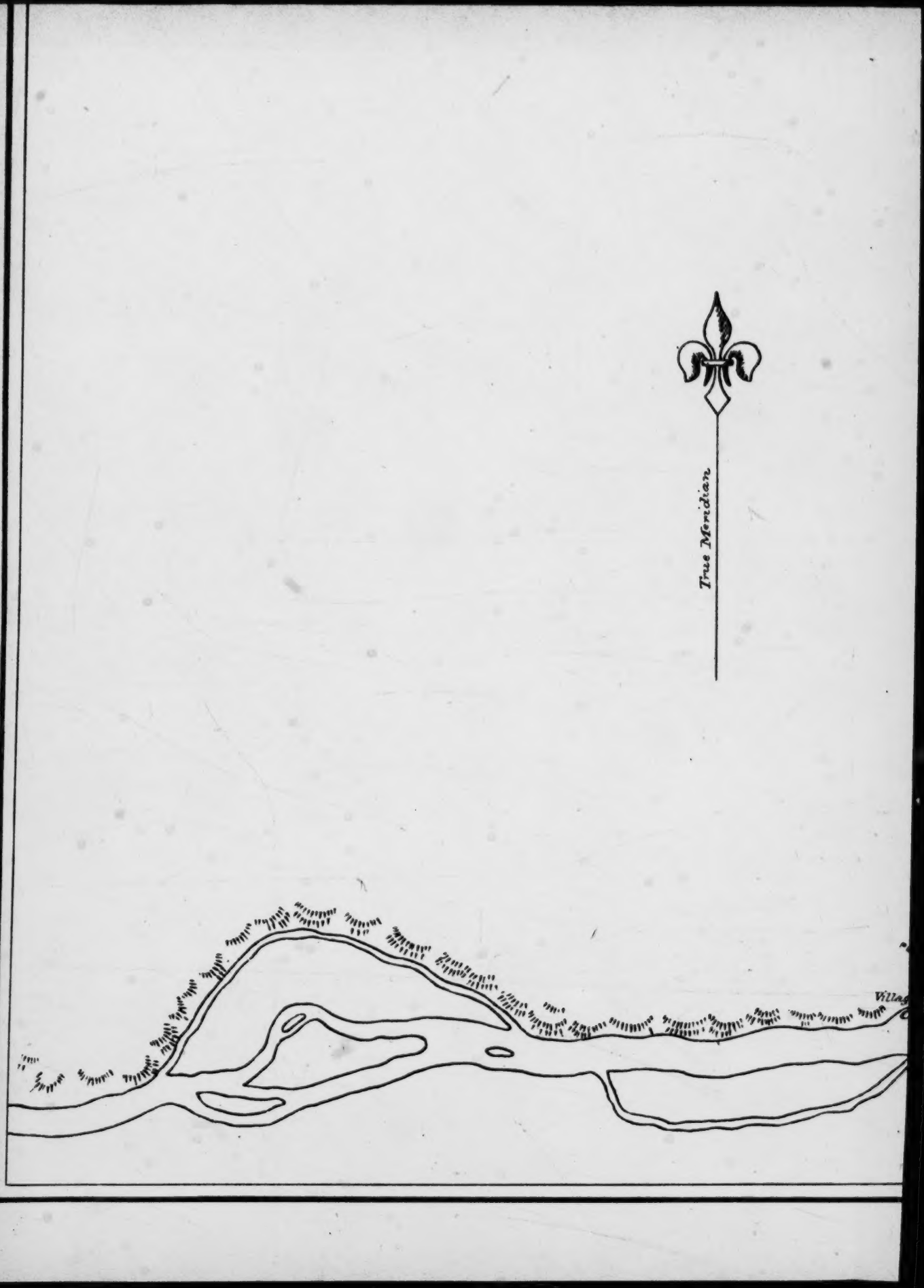
Sheet No. 16.

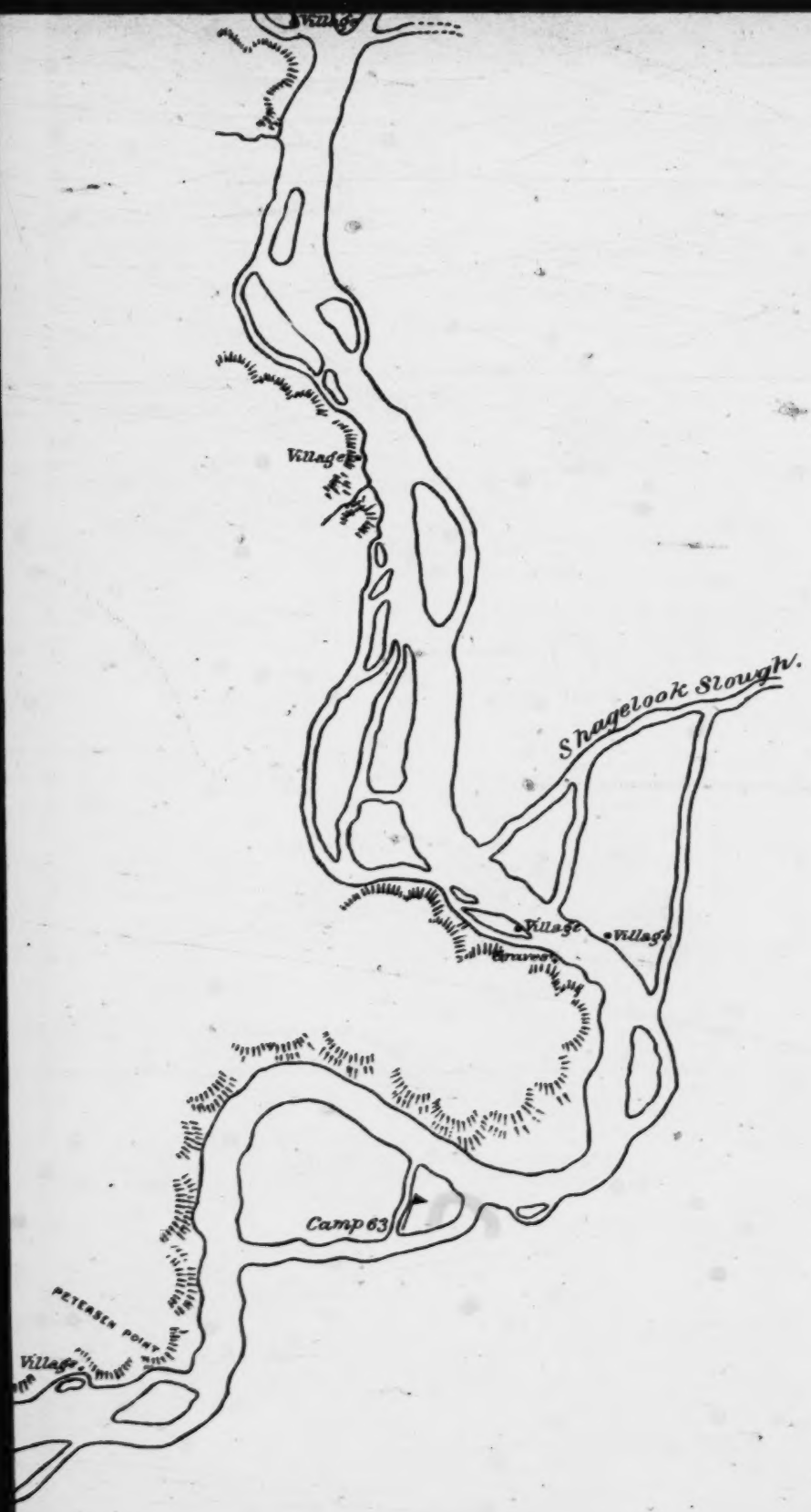

True Meridian
Camp 59
Graves
Village
Village
Camp 60

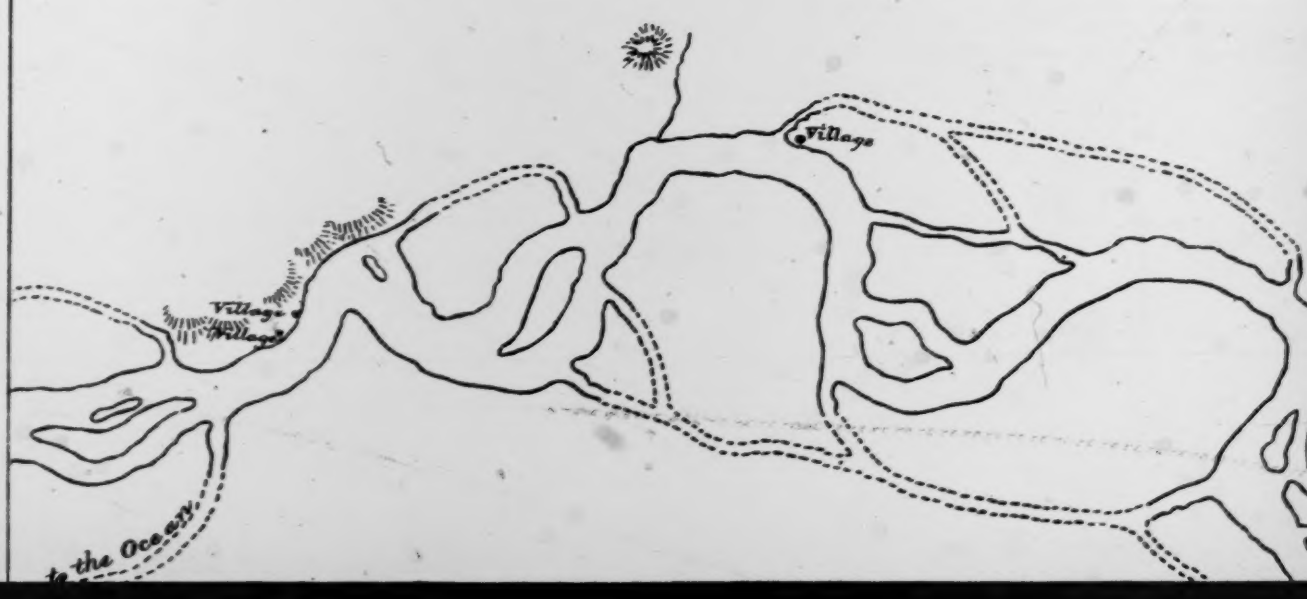


Sheet No. 17.

Village
FOX POINT
Graves
Caches
Camp 61
Hall's Rapids
Shagelook R.
ANVIC
Camp 62
Village


True Meridian
Villag

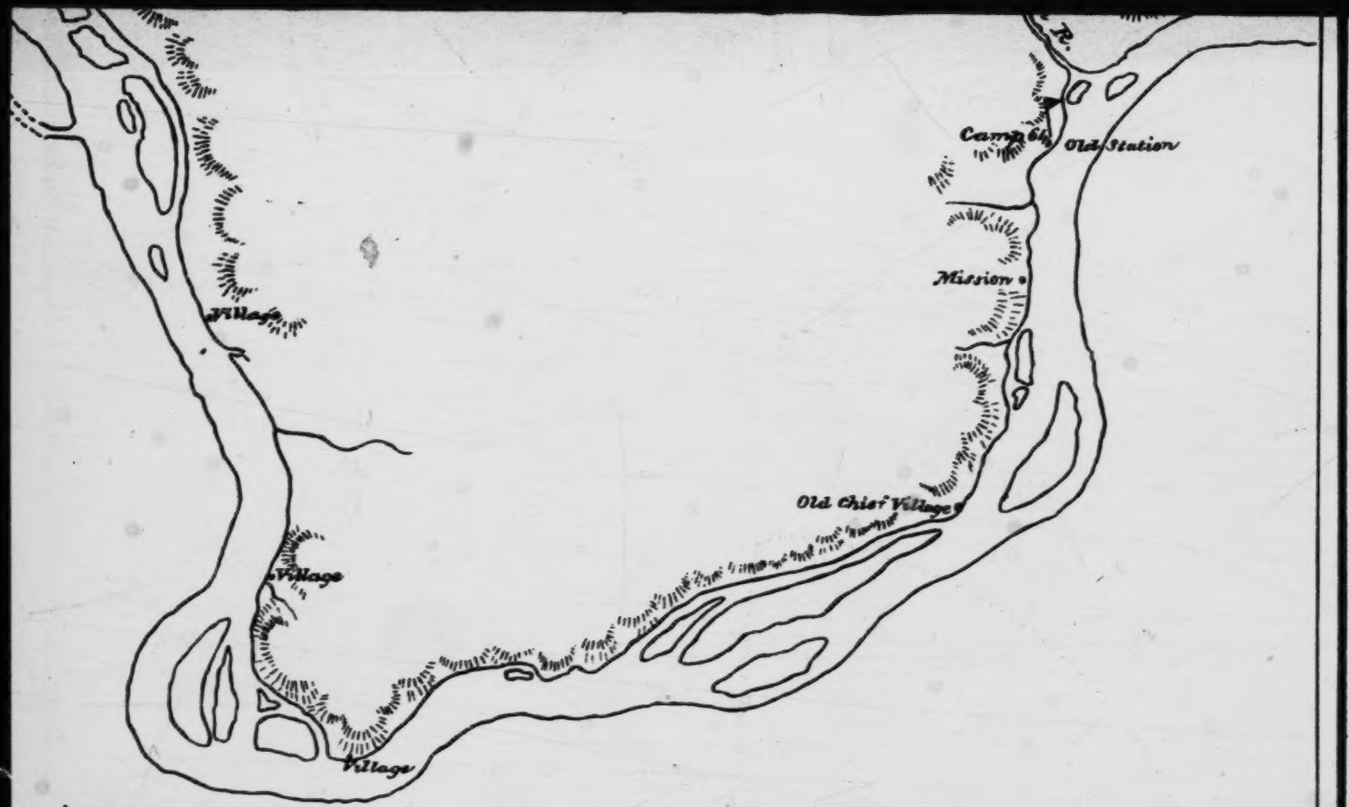

Village
Village
Shagelook Slough
Village
Village
Camp 63
PETERSEN POINT
Village

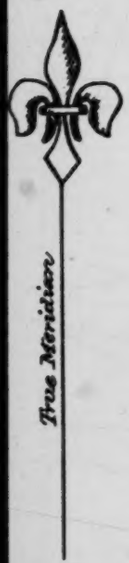

Village
Village
Village
to the Ocean

Sheet No. 18.

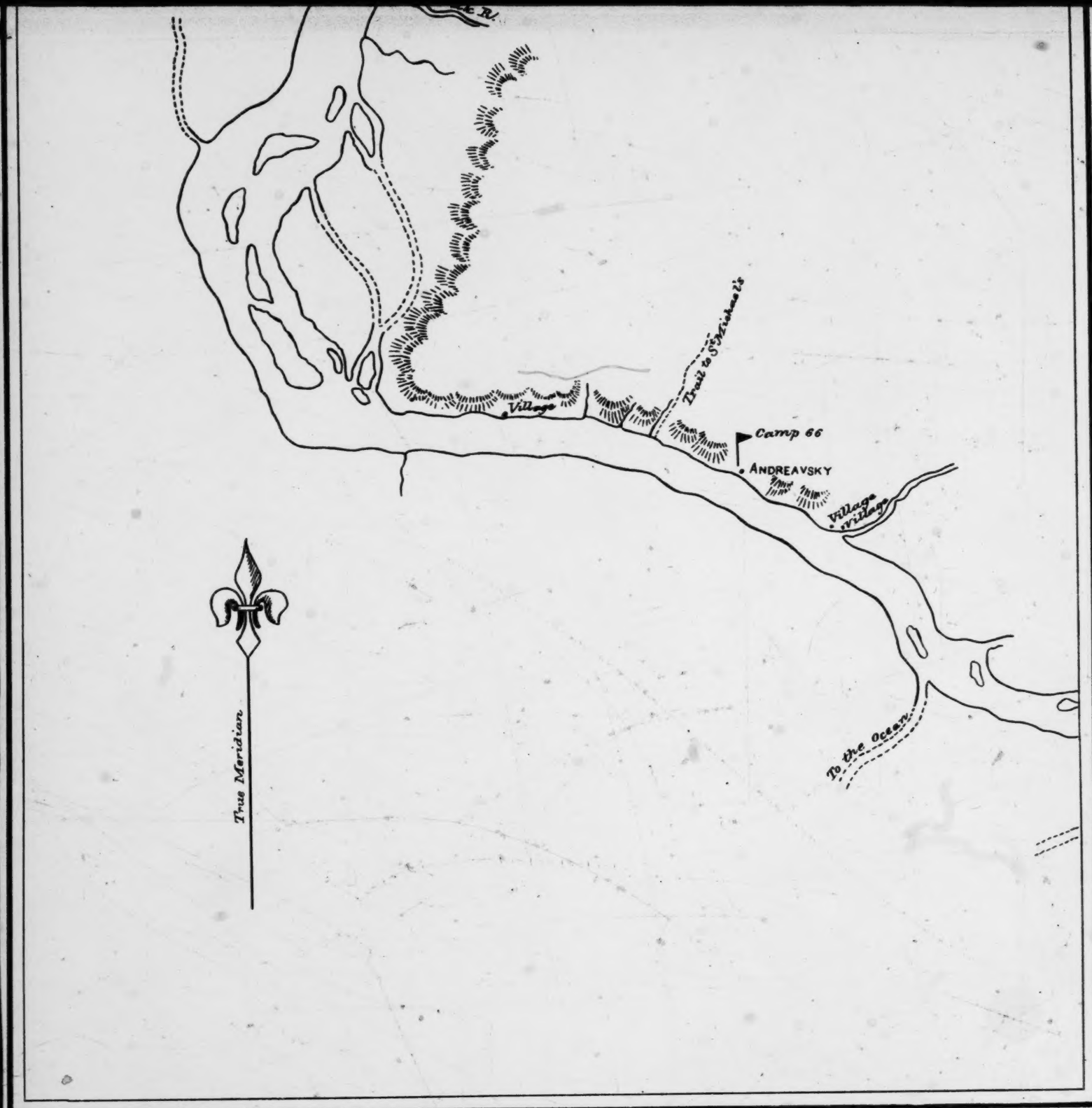
to the Oce

True Meridian

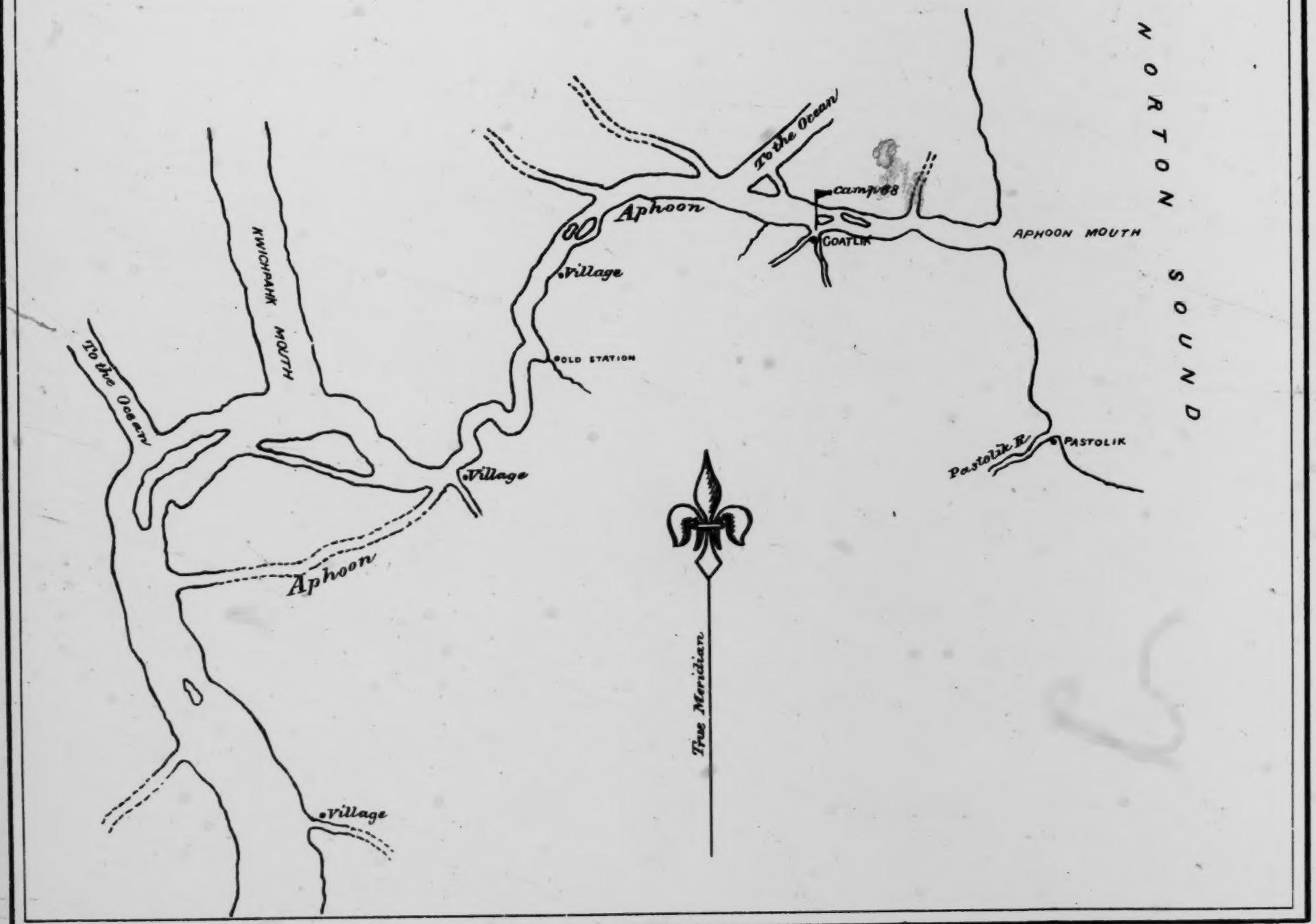

Camp 64
Old Station
Mission
Village
Old Chief Village
Village
Village


True Meridian

Sheet No. 19.


Village
Trail to St Nicholas I.
Camp 66
ANDREAVSKY
Village
Village
To the ocean
True Meridian

Sheet No. 20.


To the Ocean
Aphoon
Village
KWICHPAHK MOUTH
To the Ocean
Village
Aphoon
Village
To the Ocean
Aphoon
camp 68
COATLIK
APHOON MOUTH
NORTON SOUND
GOLD STATION
Pastolik R.
PASTOLIK
True Meridian

On the 17th we drifted about 25 miles, there being but little of interest to chronicle.

The 18th we made camp 59, and the 19th drifted but nine hours, owing to the heavy head gale, which, continuing next day, we remained over.

The 21st of August we camped (No. 61) at Halls Rapids of Raymond's map, but beyond a few ripples near the northern bank and an increase of rapidity in the current where the river narrows, there was nothing to indicate them.

The 22d we reached Anvic, a trading station of the Alaska Company, kept by Mr. Fredericksen, who treated us very kindly. He had had a good deal of trouble with the Shagelook Indians recently, and was talking of abandoning his station if it continued. A number that had come down to be baptized by the priest had cut open a couple of skin boats to show their feeling, and had it not been for the friendly tribes at the station he thought he would have been robbed, and possibly murdered, in case he made any resistance.

The 23d the steamer *Yukon* overtook us and took us in tow, the remainder of the voyage being uneventful, but the survey of the river being kept up to the Aphoon mouth.

On the 30th of August St. Michael was reached and on the 8th of September the schooner *Leo*, that had relieved Lieutenant Ray's meteorological station at Point Barrow, came into St. Michael, and through the kindness of that officer passage was secured to San Francisco, where the party arrived October 5. On September 17 the party landed at Unalaska, in the Aleutian Islands, and remained several days studying and compiling data regarding the Aleuts, which will be found in the proper subhead.

It might be proper in closing this report to speak of those to whom I found myself under obligations from time to time in the prosecution of the enterprise.

Of course to the members of the party itself for their untiring devotion in their several departments is due the greatest praise. The part of this report devoted to Indians, the most important in a military sense, is due almost wholly to Dr. Wilson, the surgeon.

Beyond these I should like to mention Bvt. Maj. Gen. Frank Wheaton, colonel Second Infantry; Lieut. C. A. Williams, Twenty-first Infantry; Collector Morris, at Sitka, Alaska; Wm. King Lear, Wrangell, Alaska; Captain Vanderbilt, Killisnoo, Alaska; Mr. Carl Spuhn, Killisnoo, Alaska; Mr. Downing, purser, *Idaho*, P. C. S. S. Co.; Captain Carroll, commanding *Idaho*, P. C. S. S. Co.; Mr. Greenberg, of Portland, Oreg.; Mr. G. J. Mitchel, of Portland, Oreg.; Mr. Robert Habersham, of Portland, Oreg.; Captain Petersen, commanding Alaska Company's river steamer *Yukon;* Mr. Henry Neumann. agent Alaska Company's station, St. Michael.

DESCRIPTION OF INDIAN TRIBES.

TONGAS INDIANS.

This tribe of Indians, subdivided into two bands, the "Crows" and "Wolves," inhabits that portion of Alaska situated about 40 miles north of the boundary line of British Columbia, along the so-called "inland passage." They live on Tongas Island and on the north side of Portland Channel, the principal village being on the island. From Dixon Entrance to their villages would be a run of about three hours for a moderately fast steamer. The habitations are permanent and situated near the water, and as the neighboring country is mountainous, rough, and mainly composed of islands, any approach except by water would be impracticable. A free communication, however, is kept up throughout the adjacent waters by means of canoes, propelled by paddles and sails, and of various sizes; those used in war having an average capacity of about three tons.

The houses themselves, which are built after the cross section as shown here, are provided with a cellar about 6 feet deep and 20 feet square, used principally for storage purposes, but sufficiently commodious to afford the inhabitants protection against rifle bullets in case of an attack.

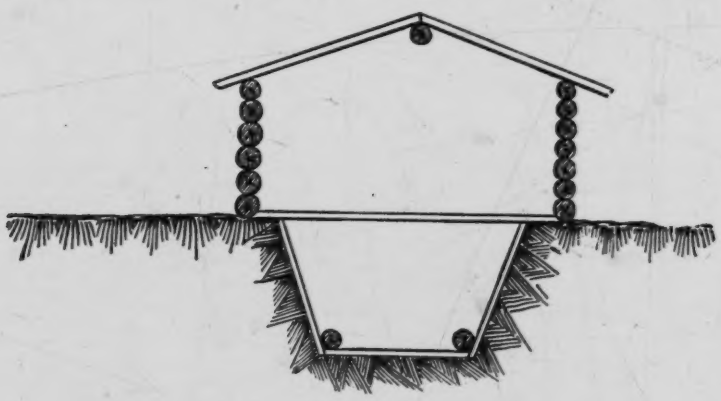
The tribe numbers about 600 souls altogether, about 200 being warriors, of whom the greater majority can be called able-bodied, and are provided with some description of firearm. These arms are for the most part Hudson Bay Company muskets, part flint-lock and part percussion,

only a few being the more modern magazine-gun. The supply of ammunition is poor, and at present obtained from the English at Fort Simpson and the salmon cannery at Boca Inlet.

In case of war with this Government it could be obtained from Fort Simpson and vicinity.

Their country is well timbered, producing a variety of berries and sufficient grass for military stock in summer, but not in winter. It presents fair prospects of gold and silver, and abounds in mountain sheep, mule deer, black and brown bears, while the waters adjoining furnish large quantities of salmon, halibut, clams, mussels, and seaweed. These last-named articles—the fish being eaten both fresh and dried—are the principal articles of food; the supply of which is secured mainly during the summer, and, with the addition of a few clams and mussels, affords them a means of subsistence in winter. In case of war during the summer they would have to rely on the game in the mountains, while in winter, as they have no domestic animals except the dog, which would furnish them food for only a few weeks at the longest, the question of starvation would soon prove a serious one. White men's clothing is universally worn by the tribe, who would be compelled to use furs should the supply of clothes be cut off, and these could not be obtained in sufficient quantities to last any length of time.

Ka-too-nah, now calling himself "Ebbitts," after the old chief, who died about two years ago, is their head chief, and exerts considerable influence, not so much, indeed, though as the two "medicine men," Nah-goot-klane and Kach-wan, who can be easily bribed, however, with



anything that is useful to them. In the event of hostilities arising, no Indian allies against them could be secured in the neighboring country, and the band living in the neighborhood of Cape Fox would most likely unite with them.

Such an event is not probable, however, for they are not warlike, though in every respect brave; have never been at war with the whites (none of whom have settled in their country), and at present entertain the most friendly feeling toward the white people.

Military operations could be conducted in the country all the year round, and to troops thus employed, besides the usual campaign supplies, a number of small boats should be furnished. Probably the best means of using a force against them, if at war, would be to send infantry in boats holding from 20 to 25 men, with small Hotchkiss cannon in the bows to drive them from their houses and force them into the mountains, where they would be unable to secure sufficient food to keep them long. A small steam launch, to overtake and capture their canoes, which are as fast or even faster than small boats, would be an effective auxiliary.

CAPE FOX INDIANS.

Kast-wan is the head chief of these Indians, both in time of war and in peace, and exerts a powerful influence over the subchiefs and the entire people. At present they have no "medicine man," the old one having died only a short time ago and no one yet appointed. When the services of such an individual are necessary, however, one is called in from their neighbors, and

his opinions are eagerly listened to and his suggestions observed. The tribe numbers about 250 souls altogether, with nearly 100 warriors, most of whom are able-bodied and provided with some sort of firearm. The flint and percussion lock musket introduced by the Hudson Bay Company is the pattern of gun most frequently met with, only very few of the men having the improved rifles now generally in use. Ammunition is poorly supplied, and obtained from Fort Simpson and the trader at Boca Inlet. In event of war with the United States, Fort Simpson would be the only source.

Their principal village was situated until quite recently in the immediate neighborhood of Cape Fox, but since the establishment of a fishing industry by white men at Boca Inlet this has been moved there, only a short distance from the cannery. The distance from the village to Dixon Entrance can be made by a good steamer in about four hours.

The region of country occupied by the tribe is in the southern portion of Alaska, not far from the northern boundary of the British possessions on the Pacific coast. It consists mainly of islands and headlands, with small channels intervening and intersected by numerous salt-water inlets.

The country is rough and mountainous in character, with numerous streams of fresh water emptying into the sea. It is very thickly covered with timber; the so-called yellow cedar being found in abundance, though not to the same extent as farther north. The soil itself is by no means fertile, it being impossible to raise any sort of produce, although various kinds of grasses flourish.

Throughout the adjoining waters salmon and halibut abound in great quantities, the former to such an extent as to have recently attracted the attention of white men, as previously stated. Various wild animals are found in this region; deer, mountain sheep, and black bears being most frequently met with. These, however, are not much sought after, as these Indians are almost exclusively fishermen. They engage in hunting to a very limited extent, and rarely venture far inland, having a kind of superstitious dread of the dense forests, which they imagine are peopled with strange creatures. As a rule they are industrious, many being employed now by the whites, and eager to improve their condition. Many appeals have been made for schools, the benefits of which having been seen and appreciated through their intercourse with the natives at Fort Simpson and vicinity, where indeed many good results have been accomplished. The dwellings of this tribe are permanently situated along the salt water, and so similar in construction to those used by the Tongas Indians as to require no repetition.

The principal article of food besides fish is a variety of seaweed, which is gathered during the summer, carefully dried in the sun, and pressed into slabs and cakes. This is combined with fish oil when eaten, and not only supplies the place of our many varieties of food, but is considered quite a delicacy, notwithstanding the fact that its odor alone would warn a civilized individual, and one not overfastidious, against even tasting it. Besides these articles of diet, various other supplies, such as are used by miners and others out of civilization, are obtained from traders. No domestic animals are found among them, except the dog, which is not employed in any useful capacity, and as food, in the event of their being obliged to abandon their usual sources, would not serve them long. The style of clothes worn by the whites has been universally adopted by this tribe, these articles being obtained from the same sources as their ammunition and other supplies. Should these sources be cut off, no little difficulty would be experienced in finding suitable garments as a substitute. Communication overland through the country is never resorted to, the only means of transportation being in canoes, which are built of cedar, and not only beautifully modeled, but very light and swift. These are propelled by means of paddles and sails, and so skillfully as to enable these people to venture on considerable journeys.

The feeling of these Indians toward the white people is in every respect most friendly; they have never been at war with the Russian Government or with our own, and hardly realize that such a thing exists. An active campaign against them could be conducted all the year through, unassisted though by any neighboring Indians as allies, for the Tongas tribe would undoubtedly unite with them. As the country differs in so few particulars from that occupied by the Tongas,

the only unusual campaign supply, in case of war, would be likewise a number of small boats. These should be sufficiently large to accommodate about 20 men and a small cannon in the bows to force them from their houses, and by guarding against an escape by water it would be difficult for them to hold out long.

STICKEEN INDIANS.

This tribe, for many years in direct intercourse with the white people, has, as is usual, not only derived many lasting benefits therefrom, through a keen desire to learn and improve their condition, but on the other hand many of the vices and corruptions of civilization have likewise been acquired.

The various whites who have entered the country, except perhaps miners, have invariably been attracted by trade, so that as a protection to themselves these Indians were forced to become shrewd and sharp-witted, which traits are very apparent in their character with only a short acquaintance. As a rule they are of a very superior intelligence, and have always manifested great eagerness to acquire civilized improvements, both in the manner of living and in working. Civilized clothes are generally worn, and the plain varieties of food indulged in by frontiersmen accepted.

The territory which they occupy lies near the western boundary of British Columbia, distant about a fourteen hours' run from Dixon Entrance. It is limited to Wrangell Island and the district of country along the Stickeen River, which stream has its source in British Columbia and flows thence in a southwesterly direction through the American possessions into the sea. The country is very generally mountainous and well timbered throughout, the yellow cedar flourishing luxuriantly. The soil itself is not fertile, but more so than the country to the south, and the season too short for any except the hardier varieties of vegetables to mature. Potatoes can be grown here, and in fact are cultivated in considerable quantities by the Indians. A few years ago gold was discovered near the head waters of the Stickeen River in such quantities as to attract universal attention and draw many men to the vicinity. Fort Wrangell, situated on the island and at present unoccupied by troops, was the depot for supplies and the starting point for the mines. Here many prospectors, industrious and otherwise, spent the winters, awaiting the approach of warm weather, so that a marked impression has been left on the Indians by their presence. In those most susceptible, and these are largely in the majority, the taste for alcoholic stimulants was not only given a great impetus, but has actually become a craving. As a remedy for this, restrictions were instituted against the introduction of liquor into the country, which answered in a measure, but when the Indians found it impossible to procure a supply they began the manufacture of a compound of their own, from molasses, called "hoochenoo," which has necessitated customs regulations against this article as well.

The principal village of the tribe adjoins Fort Wrangell and consists of a number of well-built houses. These are made of planks about 3 inches thick, and each plank as a rule shaped from a log by hand.

They are then set on edge and nicely fitted together, while a roof of bark, with a hole for the smoke, protects the inmates from the weather. The floor is of dirt and in consequence uninjured by the fire in the center, over which the simple diet of the household is cooked.

Their principal article of food is fish of various kinds, such as halibut, salmon, codfish, and herring, all of which are found in abundance in the adjacent waters. Besides these, they also employ the inner soft bark of a species of cedar, large quantities of which are collected and stored away for winter consumption. Many of the plainer articles of food, such as are consumed by frontiersmen, are sold them by traders, as stated before.

The tribe numbers about 800 souls altogether, with probably 300 men who would be capable of bearing arms in the event of an universal outbreak. The firearms which they use are generally the old Hudson Bay musket, but many are supplied with the modern repeating rifles, though not of the latest patterns. The number of these improved rifles found among this tribe is far greater than any other along this part of the Territory, on account of their long intercourse

with miners and the close proximity of the Cassiar mines, where many of the Indians were employed and paid, directly and indirectly, with arms.

In 1876 an Indian from Fort Simpson started a school at Wrangell and very soon gathered about him almost 100 pupils. At this time the post was occupied, and a soldier, impressed with the eagerness of the people to learn, made an appeal for a competent teacher. This, after some delay, was responded to, and a good school opened shortly afterwards, which has continued to prosper and increase in average attendance to such an extent as to require the services of two or three additional teachers. Many good results are manifest through the influence of the school and teachers, for in many cases the young girls have been taken away from their mothers, who, according to their customs, consider them an article of trade, and frequently sold them to white men. Cleanliness, a virtue so little thought of and cultivated by most Indians, has likewise been instilled into the minds of the attendants by the same means.

The tribe is not warlike, and at present is very friendly toward the whites, although a number of years ago they captured a trading schooner and murdered the crew. A general outbreak against the whites has never occurred, and the only difficulties have been occasioned either through disagreements in matters of trade or on account of a too free indulgence in liquor.

The presence of a gunboat has always inspired them with great awe, and they have the greatest respect for weapons of warfare superior to those employed by themselves. In the event of actual hostilities boats of some description would be necessary, as they are very generally provided with large and well-constructed canoes, and are thorough masters in the art of navigating them. No refuge could be obtained away from the seashore where they could secure sufficient food and other necessities for existence, so that a campaign against them would in consequence be very near, if not wholly, on the water. In regard to the name of this tribe and river, several who have had occasion to mention them in writing have seen fit to adopt different ways of spelling, and some go so far as to spell the name of the river different from that of the tribe, although the pronunciation in no case is affected. It is variously written as Stakhin, Stakhine, Stikine, and Stickeen, the last being adopted here as giving the most exact idea of the sound.

SITKA INDIANS.

Sitka or New Archangel, as it was called by the Russians before the purchase of the territory by our Government, contained about 1,000 inhabitants, one-third of whom were Russians. It was then the great center of trade and commerce for the country, but since the transfer of the fur interests to Americans the place has been abandoned as a prominent commercial point. It is situated on the western side of Baranoff Island, in a picturesque harbor leading out to the open sea, distant about fifteen hours' run from Dixon Entrance by the outside passage, and from twenty-five to thirty hours by the Inland Passage through Peril Straits.

These Indians, who have given their name to the town and harbor, have their principal village adjoining the town, and, like their brethren who live farther south, have always given evidence of a superior intelligence and independence. They are naturally indolent, however, and fond of dress, and exert themselves to hunt and trade in order to gratify this fancy. Their houses, as a rule, are well and substantially constructed of logs, and through the influence and suggestions of different naval officers, of late the sanitary condition of the surroundings has been much improved by the digging of gutters, which carry off the accumulating filth and water. At first this tribe was opposed to the change of Governments, as Sitka became immediately quite insignificant, but they were soon afterwards reconciled, and have been since very friendly.

Having the Russians for so long a time in such close proximity has left its impress on this people in several ways. There were intermarriages, and the offspring of these unions have generally remained in the country, so that now there is a very marked trace of Russian blood throughout the tribe. As these foreigners were not always the very best class of citizens, the manners, customs, and habits acquired of them by the natives are not those to be most admired. On the other hand, schools were established very early in this century, but did not amount to much until 1820, when they were taken in charge by a naval officer, who superintended them

for fifteen years. After this they became very efficient under a creole by the name of Etolen. All educational advantages were taken away at the time of the Russian exodus, and for about ten years afterwards no attention was given to the subject; in fact, it was not until 1880 that a school was established on a firm basis. This has continued to prosper, and now, as a better means of securing attendance and removing the boys from bad influence at home, a boarding department has been established. The tribe numbers now about 1,000 souls in all, of whom about 450 are capable of bearing arms in case of a general disagreement. They are, however, not warlike in disposition, though brave enough when occasion arises, and, like all their neighbors, have acquired an inordinate taste for alcohol in some shape or other. Before the strict regulations against the introduction of liquor were instituted no event could be celebrated, no ceremony complete, or expedition undertaken without the interested party first indulging in such quantities of liquor as to render the party wholly unfit for anything. The native drink of "hoochenoo" supplied the necessary stimulation for some time after the customs regulations were instituted, but as the principal ferments for the manufacture of this have also recently been prohibited, drunkenness is not so prevalent. As a result of this inclination and their long intercourse with traders honor is not considered an attribute sufficiently worthy of cultivation, and, indeed, never enters into the mind of most of them. No insult can be offered them so deadly that can not be atoned for by a pecuniary recompense of some nature.

The firearms employed by them are as a rule the same as those mentioned before, namely, the old Hudson Bay Company muskets, some flint and some percussion, with very few improved rifles. The supply of ammunition obtained from traders is poor in quality and in quantity, and, as it is only purchased when needed, would be entirely cut off in the event of war with this country, except, perhaps, by making the journey to Fort Simpson. This source could hardly be taken into account, however, as the distance is considerable, and their only means of transportation is by canoes, which, indeed, are large, well built, and ably managed by their owners.

Civilized clothes, except, perhaps, shoes, are worn by this tribe, and they likewise purchase many articles of food from traders. Fish is their principal food, halibut, cod, and herring being found abundantly, the last in such quantities as to be secured by means of a simple implement similar to a rake. They merely whip the water with this and rarely fail securing a fish on every prong. The country adjoining does not differ much from that already spoken of, being a network of islands with salt-water channels and inlets intervening. It is generally mountainous and thickly covered with timber, and produces only the hardier varieties of vegetables and other produce.

The principal animals hunted are deer, mountain sheep, and mountain goat, the horns of which furnish them material for the manufacture of ladles and spoons, which are oftentimes very curiously carved, while the wool affords them material for making blankets.

The influence and popularity of a chief among these Indians depends largely on his liberality, it being a custom among them to give what is known as "potlatch" when an individual desires to secure favor. This is a kind of feast where each guest receives a present, and as much as $500 worth of blankets are known to have been distributed at such a gathering.

Many outbreaks have been threatened by this tribe, arising mainly through the influence of liquor and the natural viciousness of some influential man with the idea of bettering his condition. In 1877, after the withdrawal of the troops, considerable excitement was occasioned by the threats of a chief, known as "Sitka Jack," but the appearance of a gunboat quieted this without any bloodshed. As friendship, unaccompanied by any prospect of reward, is by no means a characteristic trait of these Indians, bribes of some kind judiciously made would at least prevent the neighboring tribes joining as allies, provided they did not feel aggrieved themselves, and perhaps secure them as a valuable aid to the whites.

The medicine man, or "shaman," as he is more generally called, exerts a strong influence with the people, and as his skill is exerted more particularly against evil spirits and in determining important questions than in curing disease, it would be a great aid, in the event of war, if he could be inspired by a spirit who would at least not be an enemy of the white people. This tribe of Indians have always had the reputation of being the worst of all the Thlinkets, and

although it has never engaged actively against the Americans as a tribe, nevertheless, to the Russians, it was for a long time a discordant element and the cause of many bloody feuds. The natives looked with hostility upon the erection of the first permanent post in this region, Fort Archangel Gabriel, near the present site of Sitka, and in less than two years afterwards called a council on one of the islands for the purpose of devising means of driving out the Russians.

In May, 1802, the fort was attacked, the inmates driven out, and over thirty people killed. The remainder took to the woods and were only saved by the opportune arrival of an English vessel. Later in this same year many Aleuts and Russians were attacked in one of the numerous bays and only the commander and some few Aleuts escaped. A sensational story is told, partly true, no doubt, of the Indians fortifying themselves on a rock, the present site of Sitka, defending it with two cannon previously captured, and only evacuating it, without surrendering, however, after exhausting their supply of ammunition. This occurred in 1804, and the Indians are said to have killed a number of dogs and even infants to prevent them giving an alarm, and before leaving their position succeeded in killing and wounding many Russians. This hostile feeling was very embarrassing to the new settlers, not only on account of their being constantly in imminent danger of losing their lives, but the natives also could not be induced to trade, and even maintained this determination until about 1815, after which a more friendly feeling arose. As the country occupied by these Indians is so similar to that previously mentioned, the character of a campaign and the unusual supplies needed would be essentially the same, and as there are likewise very few trails inland such a campaign would undoubtedly be near, if not on, the water.

KOOTZNAHOO INDIANS.

In regard to the spelling and pronunciation of the name of this tribe various ways are employed, arising from a difference in the interpretration of the sound by different individuals, owing to the extreme difficulty of learning the language. It has been variously spelled Kootznahoo, Koutznou, Kootznoo, and Kooshnoo, which in almost each case would convey nearly the same sound. The tribe is divided into two bands, the Kootznahoos proper and the Neltooskins, each of which is composed of many families, and occupies a separate village on the western shore of Admiralty Island between Point Gardner and Point Retreat. The Kootznahoos have their principal village near Kootznese Head, at the mouth of Hoods Inlet, while the Neltooskins, about 250 in number, live about 12 miles south of this. The country, like that previously described, is mountainous and rough, thickly covered with timber, and surrounded in every direction by water. The run from Dixon Entrance could be made by a moderately fast steamer in from eighteen to twenty hours. This region abounds in various kinds of game, the ones principally hunted by the natives being deer and bears. The soil is generally moist, thickly covered with moss, and not especially adapted to the cultivation of the ordinary garden produce, notwithstanding which, however, the Indians raise considerable quantities of potatoes and turnips.

The houses occupied by them are built permanently near the water's edge, of logs and hewn timber. Most of them are provided with cellars, and, as a rule, are absolutely bullet proof, but would necessarily be abandoned if the attacking force were provided with the lightest forms of artillery. Regular streets, lanes, and alleys separate the different houses, which are generally surrounded by small gardens, planted in well heaped-up rows, to allow of ample drainage, as the rainfall in this region is very considerable.

Strips of bark are stretched across from the fence on each side so as to present the appearance of a net or snare to the ravens, which are very numerous and, unless some such device is resorted to, prove very destructive to anything like a garden. The adjoining waters abound in many varieties of fish, those found in greatest abundance being salmon, halibut, cod, and herring. At Killisnoo quite an extensive establishment is in operation for the curing and packing of cod and herring, and has not only proved a pecuniary success to the originators, but has given the Indians employment, and has thrown them more intimately in connection with the white people. These Indians have seen and appreciated the advantages of education, and have made numerous

requests for the establishment of a school in their neighborhood, but up to this time one has not been opened.

As a rule they are industrious and willing to work, although very prone to dictate their own terms of pay, and especially apt to stop work when injudiciously paid beforehand or when they have their employers at a disadvantage and see an opporunity of improving the terms. Their ideas of anything like a business contract, notwithstanding a pledge be given, are very crude indeed.

Besides furnishing them food, they have to rely on the water for communication with their neighbors, through the medium of their large and well-built canoes, as there are very few trails inland, and these are not made use of except perhaps by hunting parties. The various kinds of fish already mentioned, grease and oil obtained therefrom, pressed seaweed, the inner bark of the spruce and a certain edible root, together with potatoes, which they raise, are their chief articles of food, independent of the white people; but they also rely on the trading stores for various other articles. Ample provision is made for the long winters by securing quantities of these same articles which are stored up in their houses. The clothes which they wear are such as are used by the whites and are universally preferred to those made of skins, notwithstanding the fact of their being well versed in the art of tanning, and could manage to get along in this way, though indifferently, in the event of their supply being cut off.

The tribe numbers from 600 to 800 souls, with from 250 to 300 men who could be considered as able-bodied. The old flint and percussion lock musket of the Hudson Bay Company is the pattern of gun most generally in use, together with quite a number of percussion revolvers and very few, if any, magazine rifles. Ammunition, as well as the various other useful articles which they buy, is obtained from Killisnoo, which place would be shut off should trouble occur with this Government, and then their nearest source would be at Fort Simpson. Each of the two subdivisions of the tribe has a separate chief, Kanalkoo being the head chief of the Kootznahoos, over whom he has not a great deal of influence, while Kahchutka occupies the same position among the Neltooskins, who, with the subchiefs as well, have great respect for his opinions and suggestions. In the event of hostilities these two bands would in all probability unite, although they might not, as a difficulty occured between them some twenty years ago, since which time there has not been the greatest friendship manifested. The head chiefs in such an event might likewise be changed, for in a quarrel which occurred a few years ago with the Stickeens the tribe was led by a Kootznahoo woman, known as "Feather Legs."

In regard to the medicine men, each band has one or two, and their influence, though almost lost among the Kootznahoos proper, is very strong with the Neltooskins. These shamans are supposed to be inspired, but nevertheless are essentially mortal, and resemble the rest of the tribe so closely that a well-directed bribe, should occasion occur, would not fail in producing happy results.

This tribe of Indians, as a distinct band, have never been at war with the Russian Government, and have had but one serious difficulty with the United States, which happened a little over a year ago. Several of the men were employed by the Northwest Trading Company on a small steam launch in catching whales, and one man was killed by the accidental discharge of a bomb-gun, used for hurling the lance. The Indians, instigated by a woman, it is said, saw in this an opportunity of gratifying their avarice, and immediately demanded 200 blankets as a consolation for their grief and recompense for the death of this member, and in order to make their demand more emphatic, took forcible possession of two white men, held them as hostages, and threatened to kill them unless their demands were complied with. These claims were of course considered absurd in every respect, and the Indians were informed that their villages would be destroyed unless the men were given up. This threat was looked upon in the light of a joke by the tribe, who had no real appreciation of the character of a gun-boat and the guns with which one is ordinarily provided, consequently they showed no inclination at all to comply. A small tugboat was then equipped with a crew and arms from a Government vessel, and soon afterwards opened fire upon the village. At first the shots were well directed entirely over the houses, so as to allow the occupants ample time to escape, after which several of the houses were

destroyed, more for the moral effect than from any desire to injure their property. After this the Indians were only too glad to listen to reason, and notwithstanding the many adverse criticisms and slurs cast upon the proceeding by numerous papers throughout the country, the general result, as attested by the white men in the neighboring country, has proved most salutary.

The Indians, without sustaining any loss of life or serious loss of property, which would necessarily have occasioned a certain amount of bitterness, now appreciate fully what the white people are capable of accomplishing against them, and since that time have not only conducted themselves more respectfully, but also now entertain a higher regard and a more friendly feeling toward the Government and the white men living in the country.

At this time the tribe threatened to abandon their houses and stores and retreat inland, but manifested no tendency to carry it into effect, which shows that such a proceeding was at least thought of, and at the same time its difficulties fully appreciated. None of the neighboring tribes joined them in this difficulty, and in all probability would not do so should occasion occur again, and farther, would not unite with the whites as allies unless sufficient inducement were offered in the way of reward. Military operations can be conducted all the year through by water, and as all their belongings are situated so near the sea, a campaign against them, to be successful, would undoubtedly require a number of boats as an unusual campaign supply.

HOONAH INDIANS.

This tribe of Indians, whose name is variously spelled Hoonah, Hunna, Hoonyah, and Hooneak, numbers in all from 600 to 800 souls, with from 250 to 300 so-called warriors.

They have not been thrown so intimately with white men as many of the other tribes of this large family, but through intercourse with other Indians and a few traders, who have been in the neighboring country for many years, civilized improvements in manners and customs have been very generally acquired. They are naturally bright, and from their long experience in matters of trade have become very shrewd; combining this quick wit with an entire lack of scruple, a merchant with no lack of business tact would find himself sadly worsted in a trade, unless acquainted with their character. In bringing about a trade all sorts of devices are employed to enhance the value of their furs, and it is said that skins of small value have even been dyed so as to represent a more valuable variety of the same animal. As a rule, they are quite industrious and willing to work for the whites, if paid sufficiently well to suit their own ideas of justice, but if provided with all the necessary comforts in the way of food and clothing they are not greatly distressed on being out of employment. During the summer of 1881 a school was established at their principal village, which was immediately well attended, its advantages being fully appreciated by the older members of the tribe, who had made many requests for one previous to this time. The tribe is separated into two villages, the larger of which is situated on the northeastern shore of Chicagoff Island, at Port Frederick, while the smaller is on the mainland directly opposite. This point is distant from Dixon Entrance a run of about twenty-five hours. Their houses are well built of roughly hewn timber, near the water's edge, and, as a rule, substantial enough to prevent the passage of bullets, but would necessarily have to be abandoned should any weapons carrying larger missiles be used against them. The character of the country does not differ from that farther south, being mountainous near the water and hilly inland. It is everywhere thickly covered with timber, and generally unproductive unless great labor be expended in clearing and draining. The Indians, however, do cultivate gardens and raise considerable quantities of potatoes, which vegetable holds a very important place among them as an article of food. Deer and bears are found throughout the country, and are hunted for their skins and meat. Besides this game, their chief reliance for food, except what they obtain from traders, is in fish, cod, herring, halibut, and salmon being found in abundance. Many seals are also caught in the adjacent waters, the flesh of which is likewise used as food. The firearms found among them are the Hudson Bay Company muskets, flint and percussion lock; also some percussion pistols of a very old pattern, but very few improved breech-loading rifles. Ammunition, together with other useful articles, both of food and raiment, is obtained at Killisnoo, which source in the event

of war with this Government would be denied them, and as there is no other point near at hand it would be very difficult for them to find another source. Traders furnish them with material for their clothes, which are, in pattern and kind, such as are worn by white men and only purchased when needed, so that, like their ammunition, would be cut off in the event of hostilities. Wealth among them is not reckoned in dollars and cents, but according to the number of blankets an individual possesses, and as these are often bought and stored away, would in consequence prove of great service could they manage to preserve them from harm during a difficulty of any kind.

Communication by land is rarely resorted to, on account of the character of the country and the paucity of trails, so that when they have occasion to make any journeys at all their main reliance is in their canoes. As with all the other Thlinket tribes, the custom of holding slaves was formerly very much in vogue, but is now kept up to a very limited extent on account of the influence brought to bear against it by the whites and the difficulty of obtaining them. Formerly the struggles between the neighboring tribes being of such frequent occurrence, the unfortunate captives furnished sufficient numbers, but as these difficulties rarely ever occur at the present time, wherever the custom is maintained, slaves are secured by trade. This method was employed to a large extent, too, as testified by the Indians found among them from tribes far removed. In former times these slaves had very few rights; they could not acquire property or even marry without the consent of their masters, and were distinguished from free men by the absence of certain ornaments generally worn by the tribe. At certain festivals it was the custom to make human sacrifices, the victims for which were generally selected from among the old and feeble slaves, as the younger ones were considered too valuable, and although favorites were often brought forward, yet in almost every instance were afforded an opportunity to escape, and after the festival was over could return without fear of being punished. At the present time such sacrifices are rarely, if ever, made, and slaves enjoy almost the same privileges as others of the tribe.

Kensetl is the head chief of the tribe and exerts a powerful influence, not only over the subchiefs but the entire people. His feeling toward the whites in general is very friendly, and especially so toward the very few who live in the country. These Indians have never been at war with the Russian Government or with our own, but some time in 1860 they are said to have captured a steamer belonging to the Hudson Bay Company.

In time of war the two villages mentioned before would unite together against an opposing force, and although there are no Indians in the neighborhood who would be liable to unite with them, yet, on the other hand, would not join the whites, as allies against them, unless sufficient prospect of reward be offered. A campaign could be carried on in this section all the year round, although many difficulties and hardships would be experienced on account of the cold winters. Considering the fact of their supply of food being obtained chiefly from the sea, and their homes being almost at the water's edge since the earliest times, they would experience great difficulty in sustaining themselves if compelled to abandon their houses; consequently would not retreat inland, only as a very last resort. Their canoes, in an event of this kind, would be of great service to them, so that a number of small boats would be absolutely indispensable as an unusual campaign supply.

AUK INDIANS.

A short time ago very good prospects of gold were discovered on Douglas Island, situated directly opposite the winter village of this tribe, which created the usual excitement in such cases, and served to bring into the neighborhood the same class of men who ordinarily respond to rumors and reports of like nature. Some of these men are, of course, hard-working, sober, and industrious, but the majority, as a rule, are idle, visionary, and devoid of principle, and being disinclined to work are thrown more intimately with the residents. Such was the case, in this instance, with these Indians. Living very near at hand and being attracted still nearer by the presence of the whites, they had nothing to do except to provide for the absolute necessities of life, and besides were not disinclined or in any way slow in imitating the habits of the whites; so

that among other things the desire for alcohol, though perhaps not initiated, was quickly nourished, and many disturbances between individuals occurred in consequence. Gold was not obtained in the large quantities at first anticipated, so that many of the men returned. But the effect of their presence is very apparent on the tribe; some remained, however, and still occupy themselves in mining. The rush of people to this quarter of course called attention to the Indians living near at hand, so that an effort was made, in the right direction, to improve their condition by opening a school, which, however, has not yet been permanently established. Douglas Island is in the northeastern extremity of the Alexander Archipelago, separated from the mainland by a narrow salt-water channel, and distant from Dixon Entrance a run of about thirty hours.

A small town was established at the time of the gold excitement, which now affords these Indians a convenient place to obtain the useful articles which traders generally offer for sale.

The country surrounding is mountainous near the water, well covered with timber, and about as productive as that situated to the south and already spoken of. It is capable of cultivation, in a measure, with considerable care and labor, so that the hardier vegetables only do well.

Game of various kinds, such as deer, bears, both black and grizzly, mountain sheep, and mountain goats, is found in moderate quantity throughout this section, and is hunted by the Indians for meat and skins. The tribe, however, is more inclined to gain a living by fishing, and indeed do depend on the water for most of their food, as many varieties of fish are caught in the adjoining waters. Salmon, halibut, and cod abound in large quantities, and are the principal articles of diet.

On account of the few trails running through the country, long journeys into the interior are rarely ever undertaken, and when occasion arises to communicate with any neighboring places, canoes furnish them their only means of transportation. These are well built and strong, and are of various sizes, the largest being capable of carrying 2 or 3 tons. A canoe, in fact, almost takes the place of some one of the domestic animals which are so useful to other tribes of Indians and to civilized races. No horses, cows, or other animals, except the dog, are found among them, and this last-named animal is employed in no useful way, except perhaps in hunting. As an article of food, were they deprived of their usual supply, it would not serve them for any length of time, so can hardly be regarded as in any way indispensable.

The tribe, whose name is variously spelled Auk and Awk, is divided into numerous separate families, each with its subchief, and numbers in all about 700 souls. Of these, from 200 to 250 are capable of bearing arms, and most of them are provided with some sort of gun, bows and arrows having long since fallen into disuse. The old style of musket formerly sold by the Hudson Bay Company is almost the only pattern of gun found among them, besides a few cap revolvers, and perhaps three or four improved rifles. The main winter village, as stated before, was formerly on the mainland 7 miles distant from Juneau; but as many of the Indians have found employment among the whites, a considerable number now live in the neighborhood of the town. Their houses, as a rule, are well and substantially built, many being provided with windows, and except for the extremely uncleanly condition which usually exists would be far from uncomfortable.

Ammunition and the plainer articles of food, such as flour, meal of various kinds, tea, coffee, sugar, etc., are obtained from traders near at hand, which sources would necessarily be denied them in the event of trouble, unless they took forcible possession of the stores at the very commencement of any difficulty.

The head chief and two or three medicine men of the tribe exert considerable influence over the people, and are listened to with attention and respect when a difficulty of any sort occurs. They have not, however, the interests of the tribe so much at heart as to be utterly regardless of the value of presents, especially if applied judiciously for their individual use. Their feeling, as well as that of the entire tribe, is at present very friendly toward the whites living in the country, and, instead of manifesting any jealousy at the approach of strangers, seem very much pleased to have them come in. No time is mentioned of their ever being at war with the Russians, and no serious difficulty has occurred with the United States, the only disturbances arising being between individuals as a rule, and generally growing out of a too free indulgence in some preparation of alcohol. In the event of actual warfare there are no Indian tribes in the

neighborhood who would unite with this people, unless they themselves happened to be offended, nor are there any who would join the whites as allies unless sufficient compensation be offered for their services, and then they would be of doubtful value, as all of the adjoining tribes in this section of country live on very friendly terms. There are enough white men in the country to make a very firm and determined resistance against a general outbreak, and there are said to be 100 Springfield rifles at Juneau, deposited by the United States Treasury Department, which would necessarily be of great service. A campaign could be carried on in the country all the year round, but many hardships would be experienced on account of the cold. Such a campaign should be provided with boats, as the Indians would keep to the water as long as possible, and would only retreat inland as a very last resort; for, unless able to carry with them supplies of dried fish, etc., they would experience the greatest difficulty in existing, especially so if in the winter time.

CHILKAT INDIANS.

The name of this tribe is variously spelled, but as regards the true way, it would be very hard to give a decided opinion, or claim one as more correct than any other; for, in that case, the same idea of the true pronunciation might not be conveyed to different individuals. A fair idea of the sound is given in the orthography used at the beginning of this description, but various other methods besides are in use, such as Chilcot, Chilcat, Chilkaht, and Chilcate. These Indians, until a comparatively recent date, have kept themselves away from any civilizing influences, and on account of the ill feeling which they have always expressed toward white men entering the country, have always been regarded as extremely independent and warlike on account of their leading a more active life and venturing inland on long journeys. They are undoubtedly more warlike in their character than others of the same family, who have always lived entirely along the water's edge; and this accounts in part for their unfriendly feeling; but the fear of having their trade with the interior Indians interfered with was the prominent reason for their behavior. As traders they are equal in every respect to civilized men; and as honesty is by no means a prominent or characteristic trait among them, to deal with them successfully requires the closest attention. Trade with them has always been eagerly sought after by white men, as they are by far the wealthiest of all these Indians previously described, and through their great energy have the best furs to dispose of. Formerly all trade between the whites on the coast and the Indians living in the interior had to be conducted through this tribe, as they would not allow white men to venture inland over their trails, which were the only ones, nor would they allow the interior natives to even come to the seacoast. In this way they had a complete and absolute monopoly of the trade and could dictate almost any terms they chose to both parties. Only a few years ago a party of prospectors started out from Sitka, and, desiring to go into the interior toward the headwaters of some of the numerous rivers, were forbidden to proceed, and had they persisted would undoubtedly have been subject to insults, if not to positive injury. Recently, however, many whites have settled directly in the country, and although very few if any have made journeys inland for trading purposes, still many miners have gone over the trails, being even aided by the tribe; and the so-called "Stick" Indians of the interior are seen in the villages near the trading stores.

This change of feeling was due probably to the establishment of different industries in the country by the whites, thus giving the Indians a less laborious, but at the same time as lucrative an employment, and the gradual breaking up of the monopoly of trade. This trade with the interior is not yet abandoned, however, as these Indians still continue to make their journeys of fifteen to twenty days' duration, going up to the very head of navigation in their canoes, then strapping the trading material on their backs, and walking until water is reached on the eastern slope of the divide. Here again they use rafts and canoes to carry them to the different villages, and come back loaded with furs. As a rule they are somewhat below the average height, and generally of a frail build; yet with all this they carry a load of 100 pounds without difficulty, and travel over 15 miles during the day. In disposition they are cheerful, being generally fond

of jokes, especially so when directed against a single member. They are very avaricious and selfish, even among themselves, no favor being done for each other unless sufficient remuneration be made. The territory which they occupy is situated in the extreme northeastern extremity of the Alexander Archipelago. It is on the mainland and at the head of a long salt water inlet called Lynn Channel. This point is distant from Dixon Entrance, for a moderately fast steamer, a run of about thirty-five or forty hours. Near the head of Lynn Channel several small streams find an outlet in the sea, and along these streams were formerly built the permanent villages of the tribe.

Since the arrival of whites among them many of the Indians, as is usually the case, have moved their houses near the trading stores, etc., so as to be more conveniently situated, being employed in many different capacities by the white men.

During the past year two salmon-canning establishments were started at Pyramid Harbor, situated near the head of the channel, and a great number of the Indians, though not yet employed in the more skilled branches of this industry, have found work of various kinds. They can hardly be considered as faithful workers, for they resort to every possible plan to lessen the quantity of work and at the same time command the same reward, and have been known to steal wood after selling it, and then dispose of the same again as a new lot.

The surrounding country is very mountainous near the sea and hilly inland; everywhere thickly covered with timber, and as a rule very moist, so that in order to cultivate any gardens at all great labor has to be expended in clearing and draining; with all the labor only the few common and hardy varieties of vegetables can be raised, owing to the short season of warm and dry weather. Considerable game is found throughout this region, such as deer, bears, and mountain sheep, and are hunted by the Indians not only for their meat but for their skins as well. From the wool of the mountain sheep very handsome blankets are made by the women of the tribe, which, besides being warm and comfortable, are dyed in bright colors and prove very attractive to the eye. This art is not peculiar to this tribe alone, but they are said to be much more expert, not only in the manufacture of these, but in carving and working in silver, than many of the other branches of this family. Various kinds of fish are found in considerable quantities in the adjoining waters, salmon being caught in such quantities as to have attracted the attention of white men as stated before, though the venture has not, as yet, proved entirely successful. Trading stores are in operation at these places, however, so that the tribe has every opportunity of providing itself with the various useful and necessary articles, both of food and clothes.

The supply of ammunition and the many other articles obtained in trade are secured from the stores at Pyramid Harbor, which sources would be denied them in the event of an outbreak against this Government. Civilized clothes have been universally adopted by these people, who as a rule buy the material and then cut out the different garments themselves. Should they be denied the opportunity of securing their usual supply of cloth, very little inconvenience would be experienced after a little time, as they have an abundance of furs and are masters in the art of tanning; and besides, many of the different members of the tribe reckon their wealth by the great number of blankets which they have stored away and could make use of in an emergency.

As regards communication between neighboring places, these Indians, though thoroughly versed in the art of building and managing their canoes, do not depend so much upon them for transportation as the other tribes previously mentioned, on account of their journeys taking them inland, where other means have necessarily to be employed. The dog is their only domestic animal, and besides being useful in hunting is occasionally made use of as a pack animal, though by no means to such an extent as among the more northern tribes. The trails which they make use of in these journeys already spoken of are not very well marked or by any means free from obstacles, so that in the transfer of a considerable number of men with their belongings a guide would be needed, and considerable work be required in improving the way. As many or all of them cross quite a high range of mountains, a portion of the distance is covered with more or less snow all the year around, which changes in amount according to the season of the year; consequently only after making several trips at the different periods is one capable of stating

exactly where the best road is to be found. These Indians are divided into two separate branches, as it were, with a distinct chief over each, but in manners, customs, habits, etc., are exactly alike, and in time of war would both unite against an opposing force. The Chilkats proper have three permanent villages, which are situated in the immediate neighborhood of Pyramid Harbor and at no great distance from each other. The Chilkoots, the other division of the tribe, have one village situated permanently in the Chilkoot Inlet, which is a continuation of Lynn Channel, and affords ample water for the accommodation of very large steamers even. Several of these villages are built near a flat shore, and although the ebb and flow of the tide is not excessive, yet at low water an approach is impossible except for canoes of the very lightest draught. This is a wise provision whether brought about with a motive or not, for the shallow water would prove very embarrassing to the successful management of boats either in approaching or even retreating should occasion demand.

The entire tribe numbers about 1,000 souls, or exactly 981 according to a census of Lieutenant Symons, U. S. N. Among these there are between 300 and 400 able-bodied men, capable of bearing arms and prosecuting an active attack or defense in case of hostilities. The old Hudson Bay Company musket is the pattern of gun most universally found among them, yet quite a number are provided with double-barreled shotguns, loading at the muzzle and of a very small caliber, so that a bullet can be used with almost the same freedom as shot.

With these very poor weapons these men are very successful in securing game, which can be accounted for by their great energy and an apparent ignorance, certainly a disregard, of any feeling of fatigue, even after climbing the highest and steepest hills, mountains, and canyons in the shortest space of time imaginable. The two divisions of this tribe, though at present friendly, have not always been on such intimate terms; in fact, some years ago each had separate trails into the interior, the use of which was refused members of the opposite branch. Each division, as previously stated, has its own head chief, who individually exerts a great influence over the subchiefs and the many members of the tribe. Shotrich, signifying "hard to kill," is the name of the Chilkat chief, a very dignified and venerable old man, who ordinarily dresses well, but on important occasions puts on a very excellent suit of blue clothes with brass buttons. These, together with quite a large scar on his cheek, give him an air of great importance and quite a military bearing. The head chief of the Chilkoots is Don-nah-wauk, signifying "silver eye." He also is considerably advanced in years, but is greatly respected by his entire people. The feeling of these two men, as well as that of the entire tribe, toward the whites in the country is in every respect friendly, and at present do not seem at all opposed to their coming in. On account of their superior numbers, however, and the very few whites dwelling in the region, their behavior is not always what would be desired. Especially is this the case when they are under the influence of liquor, when they become at times very insolent. These Indians have never had any serious difficulties with the United States; the only disputes which have occurred being in regard to matters of trade, and as their power and intention of doing injury was respected by the whites, no great effort was made to enter their territory when they refused admittance. Since the refusal to allow the prospectors to enter the interior country, they have not only allowed several other parties to go through, but have hired themselves out as packers of the numerous and heavy stores generally carried by parties seeking the interior.

As early as the year 1851 a difficulty occurred with the English, who had established a trading post a great many miles distant from their homes, in the interior of the country. This trouble is said to have been instigated by the Russians, which is not very probable, however, as the Indians had a motive in acting as they did, on account of jealousy in matters of trade. They had been and were carrying on a trade with the Indians living along the Yukon River, even below the mouth of the Pelly, when the Hudson Bay Company established a trading station at Fort Selkirk. This of course presented a serious opposition to their trade, and instead of resorting to the civilized method of reducing rates the Indians considered a confiscation of the goods and demolition of the buildings the best and quickest way of again asserting their monopoly. At this time a Mr. Campbell was the agent for the company, who, with a few men under his employ, were tied while the store was being plundered, and allowed to depart unharmed after

the Indians were satisfied. The buildings were then set on fire and completely destroyed, and have never been rebuilt by the English. As will be seen, most all their troubles have occurred in consequence of an interference with their trade, but now, having seen the advantages of intercourse with the whites, they not only conduct themselves more respectfully, but do not deserve the reputation of being so warlike or bloodthirsty in disposition. They have the utmost respect for a naval vessel, many of the men having served short enlistments, and are willing to listen to any terms dictated by the commander thereof. In the event of a universal outbreak against the Government the Indians have the will and power to not only make a very determined resistance, but commit considerable damage before any successful operations could be carried on against them.

In carrying on a campaign against them, their villages would necessarily be first considered. These they would have to abandon if artillery were used against them, and, unlike most of the Indians previously spoken of, they would very probably retreat inland, where it would be very difficult to follow, on account of a lack of transportation. The trail ordinarily followed being too difficult in places to permit the employment of pack animals, provision should be made at first to prevent a retreat in that direction.

There are no Indians in the neighborhood who would unite with them as allies, nor indeed with the whites, unless well rewarded.

TAHK-HEESH INDIANS.

Very little has been known of these Indians until a very recent date, on account of whites being prevented from entering their country and they themselves being kept away from the seacoast by the Chilkats, with whom, as previously stated, they carry on a considerable trade. It was supposed that they must be in considerable numbers, not only because represented as such by the Chilkats, but on account of the quantities of furs which were brought out in the trading trips undertaken at different times during the year. As no definite idea could be formed of the length of the journeys except from the number of days consumed, it was of course not known whether one village or several were visited, or whether several distinct tribes did not furnish the furs. On account of this great lack of reliable information the name given to this tribe by the Chilkats, namely "Stick," is the one by which they are most generally designated; in fact, this appellation is used when speaking of any of the interior Indians. Another name, though less frequently employed, is Si-him-E-na. Among themselves they are known by the name employed at the heading of this description, which circumstance is the authority for its use in this connection.

The tribe, as such, can hardly be said to exist, for instead of being united into one or more villages, it is divided into a number of families, each of which is far removed from another, very much as settlers in a frontier country. As far as is known they never unite for the performance of any ceremonies or dances, and have apparently no bond of union whatever, each member of the tribe being as important as any other. To show to what extent the different members of the tribe are removed from each other, it may be stated that they were first met at the Chilkoot village previously mentioned, and last seen only a short distance above Fort Selkirk. At this last-named place is a small village, unoccupied at certain seasons of the year, which is considered as belonging to this same tribe. Between these two places, so far removed, only a few habitations were met with, none of which were large enough to accommodate more than two families at the most. On the stream which unites Lake Tahko and Lake Marsh is a substantial looking house built of logs and hewn timber, with a roof made of bark, presenting quite a civilized appearance in every respect, and evidently the work of an Indian who has had more or less intercourse directly or indirectly with white men. The country over which these Indians wander is very mountainous throughout its entire extent, and presents generally a very barren appearance. About the only timber found is a variety of pine, which can hardly be said to flourish, especially along the chain of lakes, for it grows up a certain height and then dies, apparently from lack of nourishment, on account of the

very rocky nature of the soil. Immense forests of these small dead pines can be seen stretching everywhere in the distance. At certain points they attain a larger size, but are rarely ever seen alive of any great diameter. Very little underbrush exists except close to the water, and there is a great scarcity of all sorts of berries. Game seems almost unknown throughout this region, except bears, principally of the black variety, mountain sheep, and small birds, such as ducks, grouse, etc., which indeed do not abound in any quantities. As the lakes are passed the country presents a less barren appearance; the trees grow larger, and other varieties besides the pine are found. Besides bears and the small game mentioned before, moose are also found in considerable numbers. Very little if any fish are caught up near the beginning of the chain of lakes, but down farther, more especially in the streams connecting the different larger bodies of water, salmon abound and are caught in considerable quantities by the natives, who apparently subsist almost entirely on them, the winter supply being dried in the sun without salt and stored up for use when needed. Besides salmon, quantities of grayling abound, which are disregarded by the Indians, who take no pains to secure them, being unfamiliar with hooks, and they are too small to be captured with the spears which are employed by them in catching the salmon. These spears consist of three points, the middle one of which is made of iron, straight and sharpened at the point, while the two on each side are of bone, and barbed with an old nail or other small scrap of iron. These are all separate from each other,and when in use are fastened to the end of a long pole cut especially for the purpose. Small seines are also used in addition to the spears. The appearance of the Indians corresponds very closely with the character of the country, for they are the most abject looking beings imaginable. They are clothed in a combination of civilized and native clothes; the shirt generally has the appearance of having been made in accordance with the plan used by the whites, while the pants are of buckskin, the covering for the foot being continuous with the rest of the garment.

In stature they are not much below the average, but invariably present a most cadaverous appearance, as if only half nourished. Notwithstanding this apparently weak condition they are capable of carrying large packs, equal in amount to those borne by the Chilkats.

Whatever they obtain in trade, such as cloth and articles of food, comes to them through the Chilkats, and they themselves also make journeys to the trading stores at Pyramid Harbor. When an Indian trader comes into the country he gives notice of his presence by building a large fire, the smoke of which can be seen at a considerable distance, and if there are any Indians in the neighborhood they respond to the signal in the same manner. The old flintlock musket, formerly sold by the Hudson Bay Company, with a few pistols of equal crudeness of make, are their only firearms; and as their ammunition is obtained in the same manner as their other necessary supplies, an outbreak of their entire number would not be very formidable, unless there are numerous families of this tribe living elsewhere than along the headwaters of the Yukon River, which is not very probable. Their entire number does not certainly exceed fifty altogether. Communication is confined almost entirely to water and is effected by means of rafts and canoes. The last named, on account of the scarcity of timber, are very poorly constructed. The log being originally too small to make a canoe of sufficient size, a piece has to be bound along the rim to give greater depth.

In a military sense this tribe could be almost disregarded, being so few in numbers and having so little union as to be unable to cause any serious difficulty.

A-YAN OR AI-YAN INDIANS.

Before leaving Fort Selkirk several of this tribe came to meet us with the information that their village was only a few miles below, and that we would be perfectly welcome. It is situated just 12 miles below the mouth of the Pelly River and is apparently very temporary indeed, for the least possible work seemed to have been expended on the houses, which were made of brush and covered above with moose skins.

The tribe live here or in the immediate neighborhood during the warm season, when the salmon are running in the river, and scatter out during the winter, subsisting on game, which

abounds in great quantities. As well as could be determined, no provision is made for winter by drying and storing away fish, as is the custom with many other tribes. But the fish, though secured in abundance in the early summer, are generally entirely consumed before the village is vacated. The tribe numbers about two hundred souls altogether, and is divided into numerous families with several members each. The men are almost universally provided with firearms, which are mostly double-barreled shotguns of small caliber, which carry shot and bullet with almost the same accuracy. Bows and arrows have not been given up entirely, though in use chiefly among the younger members of the tribe, who are not able to obtain guns.

The Indians are of medium size and apparently good natured and kindly disposed toward the whites, none of whom have settled in their country, or even ventured there for trading purposes, although two years ago a steamboat went within a few days' run of their village. As long as the white men comply with their demands there would be no difficulty experienced, but as they are almost the worst beggars in the world these requests have necessarily to be often disregarded. The chief of this people, called "Kon-itl," is an old and dried-up individual, who probably begs more than any other member of the tribe, and would resign his authority over the people for a large-sized piece of tobacco. Civilized clothes are in use almost universally, although leg coverings of moose skin are generally worn instead of trousers. The supply of useful articles, such as ammunition, plain articles of food, etc., is obtained from several different sources.

The Chilkats, since the earliest times, have traded with these Indians and obtained from them their best furs. The English up the Pelly River furnished them formerly with many articles; and during the past few years there has been a trader who has lived during the winter about 150 miles farther down the river. They do not buy many articles of food, but live almost entirely on fish, meat, and a sort of wild pea, which grows quite abundantly throughout this section of country. As long as they have plenty to eat nothing seems to disturb them at all, and they rarely ever manifest any desire to improve their condition by adopting civilized methods of living and working. Considerable journeys are made by them, both up and down the river in their canoes, which are made of birch bark, and as a rule perfectly modeled, being very light and at the same time quite strong. The great skill displayed in the construction of their canoes seems to be entirely exhausted there, for throughout their camp were no useful articles whatever, except an occasional wooden spoon or birch basket of the rudest make.

The adjacent country is mountainous, and abounds in game of different varieties, such as mountain sheep; deer; bears, both black and brown; and moose. The last-named animal is found all along the river and furnishes almost all the meat that is eaten by these Indians. The only domestic animal found among them is the dog, which in the summer is of comparatively little use, but during the winter his services are not only employed in hunting, but in drawing sledges, and in even pack loads on his back. As a rule, however, a number are hitched to a sled and considerable journeys made over the frozen river, so that their dogs are almost as valuable to them as their canoes, and especially so when the severity and length of the winter are taken into consideration.

As far as is known these Indians have never been at war with the neighboring tribes, with whom at present very friendly relations exist, and as white men have never ventured into their country for any length of time no difficulties have occurred with them. They are not what might be considered as honorable or even brave men, for they would not dare to approach a white man with the intention of doing him an injury unless in considerable numbers, but would not hesitate to take advantage of one when he least expected it.

They are very superstitious, and have almost implicit confidence in the sayings and predictions of the shaman, who, as a rule, is a good-for-nothing individual who gains an easy living by thus taking advantage of their fears.

The territory occupied by this tribe and the Tahkheesh lies entirely in the English possessions; consequently they are of importance, in a military sense, only in respect to the aid they might furnish other tribes who live near the boundary line. The native name of the summer village spoken of before is Ka Tun.

TAKON INDIANS.

Directly opposite Fort Reliance, a trading post of only two or three log houses, and situated near the boundary line between Alaska and British America, and in the latter, is an Indian village of considerable size. The houses are not substantially built, being of logs and brush piled up, and are placed almost at the water's edge. This point is distant from the A-yan village, mentioned before, about 150 miles, and as the current in the river is quite rapid the journey downstream can be made in less than twenty-four hours without much exertion with oars or other propelling power. If occasion required a trip in the opposite direction, not only much more labor would be necessary, but much more time would be consumed, as boats would have to be "tracked," the current running about 3½ to 4 miles an hour. The Indians, in their light canoes, keep well toward the shore; in fact, as near land as possible, and push themselves along by means of two small sticks held in the hands and used like poles. In this way quite a fair speed is maintained, but not a great distance accomplished during the day, as these Indians, like many others, are generally opposed to violent exercise of any kind in which there is any element of work.

During the past few years a trader in the employ of the Alaska Commercial Company has lived among this tribe, and a steamboat has likewise made several trips to their village, so that they have had opportunities of providing themselves with the many useful articles of food and clothing, and have thus been thrown in direct intercourse with civilizing influences.

The tribe numbers about 100 souls altogether, with from 30 to 35 able-bodied men who are capable of bearing arms. The gun used by them is the double-barreled shotgun, spoken of before, and most of the men have from one to three of these, while some are provided with Henry rifles, although there are very few of these. They are poorly supplied with ammunition, having very little on hand at one time, and their only possible sources are the steamer and trader previously mentioned, the Chilkats, and Hudson Bay Company post on the Porcupine River. During the winter these Indians wander about, occupying temporary houses of moose skins, which they carry with them, and move from place to place according to the amount of game found.

The country is quite well timbered, but the soil is everywhere covered with a thick moss, which protects the ground beneath, so that only a little distance down the ground remains frozen all the year round.

Caribou and moose abound in quantities throughout this region and furnish the tribe almost their only means of subsistance, except the root of a small vine, containing considerable sugar, which is largely eaten. Quantities of rabbits are also found during the winter and in sufficient numbers to sustain a few men, or at least furnish sufficient fresh meat to guard against any chance of disease, if due care be observed in other respects. Salmon is about the only fish caught to any extent in the river, and as the season only lasts during July and August of each year, they are not depended on for food only during those months, and are not dried and stored away for consumption during the winter.

Communication by water is effected by means of canoes, as stated, and also by rafts in going downstream, and on land by dogs, which are made to pack loads during the summer and draw the sleds in winter. White men's clothing has been pretty generally adopted by these Indians, who obtain the cloth and other material from traders. If their supply should be denied them, they would experience no embarrassment, as skins of different kinds would then be used, and no trouble would be found in obtaining them in sufficient quantities.

The head chief of the tribe is called Chil-tah, who has always manifested a friendly feeling toward the whites and has considerable influence over the tribe. Although this should not always be relied on, these Indians are more under the influence of Christian religion than most others on the river, Indian missionaries having been among them from time to time, and they would have great influence both in preventing war and securing peace. There are several of the so-called shamans among them, two of whom have acquired considerable notoriety on account of their influence. One called Ee-nuk is especially well known on account of his vicious temper

and his great inclination to stir up the remainder of the tribe into committing various wrongs against the trader wintering at their village. Joseph is the name of the other man, but he does not have as bad a character as the first one. The influence of these individuals over the tribe is very strong, but as they practice this art as a means of living the interests of the tribe are by no means foremost in their hearts, consequently well-directed bribes would not fail in good results.

In the event of difficulties arising with these Indians the only allies liable to unite with them is a band of this same tribe, not included in this description, who number about 60 and live over toward the head waters of the Tanana River. Allies against them would be very difficult to secure in this section of country.

In character these Indians are not at all brave or manly, but on the contrary are great cowards; and notwithstanding their many expressions of contempt for the white man and his way of living, they have great respect for his power. One determined man could awe a crowd of them if they considered him capable of inflicting injury, but instead of making any resistance at such a time they would wait until he was off his guard. As a rule they are willing and very glad to have the whites come into the country on account of convenience in trading their furs; but last year, on account of their idleness, sufficient game was not secured to satisfy their desires, so that their demands became so frequent for charity and with such insolence that the trader considered it more prudent to remain away this winter.

To carry on a campaign against them, troops would have to be brought in by way of the mouth of the Yukon, and among the unusual supplies needed would be clothing for winter wear, such as is made by the natives living near the mouth, and for use in summer small-meshed mosquito bars as a protection against the myriads of gnats and mosquitos which swarm about constantly, and to a man weakened in any way as by wounds or sickness, would very much lessen his chances of recovery.

In regard to the name of this tribe, Takon, which is adopted at the beginning of this description, it is, as well as could be determined through our interpreter, the name by which they are known among themselves. Among the Ingalik tribes, living farther down the river, they are called "Tchi cargut kotan."

The native name of the village itself is Nu-kla-ko, consisting of about 12 houses, which seem hardly capable of holding all the Indians; for, although the number as counted by Mr. John McQuestin, a trader, was between 80 and 85 only, there were evidently many others from the Tanana country visiting at the time of our meeting them.

KLAT-OL-KLIN INDIANS.

This is a name given to this tribe of Indians by a trader's half-breed Russian interpreter who has lived among them for several years; on what authority is not known, for, although our interpreter could not be considered entirely reliable, yet, as well as could be learned, they, like the Indians just described, call themselves Takon. In manners, customs, and language they resemble the Takons very closely, but as a rule seem rather more particular in regard to their personal appearance, being somewhat cleaner and better dressed. The village itself, consisting of 7 very rudely-built houses, is about 85 miles below Fort Reliance, the river between the two places cutting through a mountain range, and confined generally to one channel, being unlike the country above and below, where many islands and gravel bars present serious obstacles to the successful navigation of steamboats and other craft. About a mile below this point are several well-built log houses formerly occupied by traders, but have since been abandoned as unprofitable, it being considered wiser, if possible, to make the Indians come to a store rather than locate it in their midst, on account of the inherent tendency among them to covet everything they see. Among the whites the Indian village is known as Johnnys, after the head chief, while the site of the trading station is known as Belle Isle; at present their ammunition and articles of food and raiment are obtained from traders who ascend the river in the early summer, and until this winter one has remained in the immediate neighborhood, so that the bad behavior of the Indians

at Fort Reliance will interfere with the general welfare of all the tribes living in this section. They were either well supplied with ammunition, or very prodigal of their small store, on account of their expecting the speedy arrival of the steamer, for our approach, as was general all along the river, was hailed by a perfect fusilade of blank shots.

Among the customs of the whites, which are imitated by all these Indians, is that of shaking hands; a small matter in itself, but one that is sincerely regretted when required by every man, woman, and child in the village. In winter these Indians leave the river and scatter out in different directions in quest of game, principally moose and caribou, which, in reality, provide them with their only food. Besides these, however, great numbers of bears are found, particularly the black variety; also deer, mountain sheep, and rabbits.

While the salmon are running in the river, they settle down at their village, which is situated close to the water's edge, and do nothing but fish. Great skill in the management of their canoes, and keenness of sight are required in order to obtain the supply of fish as they do. A dip net attached to an oval-shaped frame, and the whole fastened to a pole about 10 feet long, is their only means of taking the salmon. One of the family, generally a woman, stands up on the bank, and observing some sort of ripple or disturbance in the water, which would be totally disregarded by an inexperienced eye, points out the spot to the man, ready, at the water's edge, to start out in his canoe. He then paddles quickly out to the place, sinks his net well down in the water, and generally manages to secure the fish. Whether successful or not he returns to the shore ready for the next fish to appear in sight.

These Indians number about 100 souls altogether, with from 35 to 40 men, who are what might be called able-bodied. They are, as a rule, all armed with double-barreled shotguns, of small caliber, such as have been spoken of before. A very few of the men have the improved rifle, but as the introduction of cartridges into the Territory is prohibited, much difficulty would be and is experienced in obtaining a sufficient supply, consequently these guns are very little sought after.

The country along this portion of the river is quite mountainous and well covered with timber, principally birch, spruce, and poplar, which grow to a considerable height. The soil is everywhere covered with a thick moss, which stays moist and boggy through the summer. About the houses at Belle Isle, where the trees had been cleared away, several kinds of grass were growing luxuriantly, reaching a length of about 2½ feet, which would show that with due care and labor certain hardy varieties of produce can be raised.

This band of Indians are very kindly disposed toward the whites, and seem delighted to have them visit their village, more on account of what they can procure from them than from any other reason, as they, like most of their brethren in this part of the country, are continually begging. Anything in the shape of useful articles is acceptable to them, and such things are preferred in every instance to beads and like ornaments.

Tea and tobacco are the articles generally asked for, so that if every demand were responded to for those articles a large enough supply could not be carried into the country. In the event of trouble with this band the only Indians liable to unite with them are those living at Fort Reliance, and likewise a small village below them on the river. The only difficulty that could occur, however, would be through some misunderstanding in trade, or on account of the avariciousness of the Indians, who, besides many other faults, are very improvident indeed, and when their supply of food is not very accessible, the trader, if one is living in the neighborhood, is expected to provide for them. No white men have settled in the country, and the only intercourse which these Indians have had with civilized men has been with a few traders and some miners. The last-named individuals have not stopped long with them, however, as the prospects of rich discoveries were never so flattering as to warrant any very lengthened stays. The discovery of gold in paying quantities is probably the only incentive for men to enter the country, and were it not that indications are seen all along the river white men would probably never venture in.

To carry on a campaign against this band, troops would have to be brought in by the mouth of the river, and should be well provided with some sort of protection against mosquitoes.

TADOOSH OR CHARLEY'S INDIANS.

The village occupied by this band of Indians is known among the whites, who ascend the river to trade, as Charleys village, and is situated directly on the river, about 75 or 80 miles from the village previously spoken of as Johns; it consists of only 5 or 6 houses, which are built after the general plan of all the native houses on this portion of the river, of sticks and brush; and with just enough room to accommodate the various members of the family, including the dogs, which are by no means few in number. Had they any other domestic animals to provide for, doubtless an entirely different style of structure would be adopted.

The dog is to them what the horse and other beasts of burden are to the civilized races; and is not only used to pack on his back and draw sleds in winter, but is employed like the proverbial canal mule in drawing their canoes up stream, not, however, when a single member wishes to go on a journey, but when any number of the family moves, with the various household goods, etc. These Indians number in all from 40 to 50, and undoubtedly belong to the same tribe as those living at Belle Isle and Reliance, for they resemble them in almost every particular, and have separated doubtless on account of some difficulty which occurred years ago. All the men are armed with the same kind of shotgun as other Indians along this part of the river, and their ammunition is obtained from the same source, which is principally the steamboat, which makes the annual trips already spoken of. This point on the river is about 130 miles from Fort Yukon, and is at the limit, as it were, of the hilly country; for only a few miles beyond the country flattens out, and the river divides up into almost countless channels, with islands of various sizes between. Considerable game is found in this section, moose predominating in numbers, and furnishing to these Indians their main supply of food during the winter. In summer they live in their village on the river and devote themselves to catching salmon, which run in sufficient quantities to feed them at this time, but their means of catching them are too primitive to admit of their being caught in such quantities as to furnish them a winter's supply.

In regard to the timber of this region, it is the same as that spoken of previously, the birch being the only wood used in the manufacture of any useful articles, principally in the construction of their canoes, which are very light, durable, and beautifully shaped. A frame-work is made of a light wood, generally birch, which is securely fastened together with moose-skin string or roots of the spruce, split. A covering is then made of birch bark, fastened, wherever joints occur, with stitches made by splitting small spruce roots, which are very flexible, and the cracks are then closed with pitch, put on with a firebrand, in the same way that solder is used. White men's clothes are universally worn by these people, who buy the cloth from traders; but should the supply be cut off, no great difficulty would be experienced in finding a substitute, as they can procure sufficient furs to answer every purpose of dress without very great exertion.

The head chief of this band is known among the traders as "Charley," and his feeling toward white men is very friendly. His influence over the tribe is as a rule quite strong, but generally these men are quite independent and only consult their own individual interests; consequently any bribe or reward which would improve the pecuniary condition of single members would be accepted without regard to the general welfare of the remainder of the tribe. They hold very friendly relations with the bands of Indians living above and below them on the river, and are particularly pleased to have white men come among them. At the time of our meeting them there was a miner living at their village waiting for the arrival of the steamboat, and he spoke of having been very kindly received and hospitably entertained.

This, as well as the other tribes of this section, have peculiar ideas of right and honor, for while apparently never hesitating for an instant about making away with anything which happens to please them, provided it be not stored away, yet if "cached," as it is called, away from the owner, they will not touch it, and are said to regard this with such respect as to almost starve before helping themselves to any food so cached.

In a military sense these Indians are of little importance on account of their small numbers, and even should they join any neighboring tribes as allies, they, as is shown, would not swell their ranks very largely.

In regard to the name which is used at the heading of this description, it is one employed on the authority of a white man who had lived among them some time; but this name is not very generally in use, especially among the whites, who generally speak of them as Charley's Indians.

FORT YUKON INDIANS.

The principal village of this band of Indians is at Fort Yukon, an old station of the Hudson Bay Company, which was abandoned shortly after the purchase of the territory from the Russian Government—as soon, indeed, as it was determined that the site was on American soil. All that remains of the old post are three of the bastions and a portion of the stockade, with a few of the buildings, all of which are slowly disappearing as firewood for the steamboat. This is the only portion of the river within the arctic circle, the few miles on each side of the old post, and would hardly have been recognized as in such a latitude, at the time of our visit, for the weather was extremely warm, in every respect like that of the temperate region in summer. In reality these Indians have not what might be called a principal village, for they rarely stay any length of time in one place, but wander over the country between the Porcupine and Yukon rivers.

When the trading steamer is expected they come into Fort Yukon in considerable numbers to dispose of their furs and obtain various useful articles. This section of country is entirely different from that previously drained by the river, for instead of being mountainous in every direction, is absolutely flat, with not a single hill in sight anywhere. The river spreads out into numerous narrow channels and sloughs, with a width in some places of almost 7 miles. It has the appearance of the delta at the mouth of a large river, and unless one is familiar with the different channels, different places on either bank may be passed by without in any way discovering the error.

The number of Indians of this tribe is reckoned by men who have had considerable intercourse with them, as between 100 and 110, and although much less than this number were assembled at Fort Yukon when the steamer passed, many villages, though small, were encountered above and below, the inhabitants of which belonged to this same tribe.

All the men are provided with guns of some description, the prevailing pattern being a long double-barreled shotgun of small caliber. Some few of the old Hudson Bay Company flint and percussion lock muskets are seen, however.

The country about abounds in game of various kinds, such as deer, bear, caribou, and moose, the last-named animal furnishing the natives their chief article of food. Especially is this true in winter, when the river is frozen over, and indeed no fish running upstream in any quantities. During the summer this tribe occupies villages at different points either on the mainland or on islands in the river, and devote their time to catching salmon, which is about their only food.

Civilized clothes have been very generally adopted by these Indians, who prefer such garments, when able to obtain them, to their own, which were made of moose skin and ornamented in different places with bright-colored pieces of cloth and beads. Their supply of cloth and other necessary articles, such as ammunition, cooking utensils, plain food, etc., is obtained from traders who ascend the river from stations below, and also from the Hudson Bay Company, which has a station some distance up the Porcupine River. In former times, before the Territory passed into the hands of the United States, Fort Yukon was one of the most important if not the largest post on the river. Certainly more trading was done here than at any other point, for Indians from different tribes came from every direction to trade, and boat-loads of goods were sent down the river as far as the mouth of the Tanana River. At the present time it is not a desirable point for a trading station, consequently is not occupied, so that this tribe, though formerly thrown very intimately with the whites, is now almost completely removed from any civilizing influences. At the time of the English occupation an effort was made to improve the condition of the tribe by teaching them the rudiments of knowledge and instilling into their minds the precepts set forth in the Bible. Not much progress was made in this direction, however, other than teaching them a few hymns, which were sung with great energy by the

Indians, who had not the faintest idea of what it all meant. Being naturally fond of music, they are very ready and willing to embrace any such opportunity of exercising their voices.

The English are said to have had gardens and have been very successful in raising certain kinds of vegetables during the brief, but hot season. Their example has not been imitated by the Indians, however, who have apparently made very little progress in this direction. The head chief of this tribe, called Senantee, as will be seen by his photograph, is quite a dignified and old individual, with a countenance by no means prepossessing. He not only has great influence over his immediate tribe, but is known by all the Indians in every direction at considerable distances up and down the river, and what he suggests is respected by the various tribes. Even the traders appreciate his power, and have been in the habit of allowing him a certain amount of goods to trade for them, receiving in return a very small equivalent for their value, as the idea was not for pecuniary gain, but to propitiate this man. As there are at present no white men who are living permanently in the country no difficulties of any sort can occur, but should they enter and settle for any reason, these Indians would receive them kindly, for their feeling is in every way friendly. Senantee, though apparently very proud of his authority, is very kindly disposed in every respect and seems glad to deal with white men.

In speaking of small villages above and below Fort Yukon temporary fishing villages were meant, as throughout this flat country Indians are not found at all permanently established, and the only idea the English had in establishing a post in this section was to get as far west as possible without encroaching on Russian territory. As it was, they were some distance within the boundary, as determined by Capt. Charles W. Raymond, of the Engineer Corps, U. S. A. In the event of a campaign being necessary against this tribe troops would have to be brought in by the mouth of the river and should be provided with proper clothing, such as can be obtained from the natives living near the coast, and some sort of protection against the myriads of gnats and mosquitoes which render existence almost unbearable during the hot summer months. In fact, just as quick as the snow begins to melt they appear and do not leave until after one or two frosts.

There are no Indians who are liable to unite with these men as allies, as all the tribes throughout this region have a separate and independent existence, though a grievance of an individual tribe is generally a common one, and at present could occur only out of some disagreement in trading, as whites are thrown with them only in this employment.

TANANA INDIANS.

About 300 miles below Fort Yukon, on the south bank of the river, there enters a tributary, which, at its mouth, appears to occupy as much space and convey as much water as the main river itself. This is only apparent, however, on account of the flat character of the country in the immediate vicinity, for although a large stream it is nevertheless considerably smaller than the Yukon. The river is known as the Tanana, and, with the exception of the two white men, has never been explored to any extent whatever. These two men made a portage across the country from near Belle Isle, and came upon the river 700 miles from its mouth. The river here was about 1,200 yards wide, and from its general character it was considered that it must have flowed already a distance of over 300 miles. It was descended from here in a frail boat, rudely constructed, and covered with two moose skins, which was in constant danger of being sunk by the numerous sharp snags which were sticking up out of the water. On account of the character of the boat and the great difficulty experienced in stopping when it was desired, a too large estimate was undoubtedly made of the distance traveled, though these figures, judging from the amount of water poured into the Yukon and the increase in the rapidity of the current after its entrance, can not be greatly in excess of the true estimate. Another circumstance which would tend to show that the river at least extends a very considerable distance beyond the point where the white men came upon it, provided they traveled almost directly across country, is the fact that there is a portage which is used by the Indians from the White River across to near the head waters of this stream.

The White River is ascended a distance of 50 miles, and then a journey of about twelve days is required to reach the river. It is said by traders, who have had considerable intercourse with these Indians, that during the occupancy of Fort Selkirk the Tanana Indians were in the habit of coming directly into that post without making a journey down the White and thence up the Yukon. It is thus seen that there are, besides entering the country by the mouth of the river, three different ways which are or have been used in traveling backward and forward between these two large rivers, which were used by the Indians in communicating with neighboring Indians and traders either living permanently in the country or entering it temporarily for the disposal of their goods. It is not known how long a period was required in the journey between the river and Fort Selkirk, but probably a shorter time than by the White River. The portage across from Belle Isle requires about ten days, and as there is no other means of transporting goods than by employing Indians to pack, except perhaps in winter when sleds might be used, great difficulty would be experienced in conveying any number of men across, without reducing the baggage, etc., to the very smallest amount possible. This tribe lives all along the river, and has generally had the reputation of being very warlike and in every way averse to civilizing influences. This is true to a great extent, for they have at different times displayed considerable jealousy toward prospectors setting out with the intention of going through their territory, but on various occasions have expressed a great desire to have a missionary come among them, and have also been very anxious for a trader to establish a post among them. Their country being mountainous, and their life being one of activity, being passed for the most part in hunting game, makes them more inclined to war, no doubt, than other tribes, who lead more sedentary lives, and secure their food with less difficulty; yet they are by no means brave in the strict sense of the word, and, like most Indians, would not hesitate to take an unfair advantage of an enemy when he had the least suspicion of any treachery.

Their whole number is variously estimated as between 300 and 700, but those who have had most frequent intercourse with them reckon their number as about 500. Of these, all who are capable of bearing arms are provided with a gun of some description, either a double-barreled shotgun of small caliber, in which a bullet is generally employed, or the old-fashioned musket, which was formerly sold by the Hudson Bay Company. There are very few, if any, breech-loading rifles, and are not sought after on account of the great difficulty in obtaining ammunition in sufficient quantity to supply them, the introduction of cartridges into the Territory being prohibited. They are poorly supplied with ammunition of any sort, the supply being obtained from year to year, as it is needed, from traders principally at posts on the Yukon. In the event of this source being denied them, their only other means would be from the Chilkats or Hudson Bay Company, either directly or through the agency of Indians of other tribes. This is by no means an uncommon occurrence, for many of these Indians do not buy goods for their own use, but for purposes of trade, though this is by no means as common as with the natives along the Alexander Archipelago, who seem to take particular delight, as it were, in accumulating wealth in the shape of blankets and other useful articles. These Indians rarely possess more in the way of useful articles than what they carry with them, and have more or less difficulty in always supplying themselves with these. They are, as a rule, however, fairly well clothed in civilized garments for the most part, which they obtain from traders, yet being somewhat far removed from any trading post a good many wear the moose-skin coats and trousers. In the event of their being denied any chance of obtaining cloth, very little, if any, embarrassment would be occasioned, as only little labor would be required in obtaining skins and furs in quantities sufficient to provide for all. Their habitations, except among the Indians living near the mouth, are very temporary, being made of moose skins in the winter and generally of a lighter or less substantial character even than this in summer. Near the mouth of the river some of the tribe have underground houses, such as are in use among the Innuits, and are called by the Russians "barraboras." The principal game found along this river is moose, caribou, and mountain sheep, which, besides the salmon and whitefish caught in considerable quantities in the stream, furnish these Indians in reality their only food, for were these cut off they would not be able to exist. There are very few edible roots or berries found, about the only thing used as food being the small root of a pea-like vine

which contains considerable sugar, and is eaten in considerable quantity. Very little flour or other plain articles of food are bought of traders, chiefly, no doubt, on account of the difficulty in transporting it home.

Their means of communication are by canoes on the water, and by land by means of dogs, packing in summer and drawing sleds in winter. Rafts are not used by them on account of the rapidity of the current and the great difficulty experienced in managing such a craft. In regard to the subdivisions of the tribe, there are three bands on the lower 300 miles of the river which would unite together in the event of any difficulty, and are only distinct in the fact of their having separate heads; whether there are any divisions among the Indians living farther up is unknown.

The chief of the band occupying the section of the country near the mouth is an old man known as "Ee-van," who has considerable influence over the subchiefs and people generally.

The chief of the band living about 200 miles up is called "Jack," and exerts only slight influence. Another individual, called the black "shaman," not only exercises authority over this third division, but also performs the office of medicine man among these Indians, and his influence, as such, is very strong indeed, although it is thought that a missionary among them would completely destroy this influence, not however without danger to himself, as these shamans are very jealous of their power, and are very prone to kill the object of their jealousy themselves, or, as is often done, frighten some members of the tribe into committing the deed. At present there are no whites anywhere along the river, although only a short time ago there was a trading station some little distance up from the mouth, which has since been abandoned.

The trader who lived among them speaks of them as friendly toward the whites and the Indians living in the neighborhood, and if a man shows determination and independence in his treatment of them there need be no fear of trouble. Individual disputes necessarily arise, and in such an event if one asserts his rights in a bold and firm way the Indian generally gives way. They have, of course, never been at war with the whites, of whom and their Government they know very little, and have the most exaggerated ideas of soldiers from pictures shown them in illustrated papers, and at the same time profess to disbelieve entirely the existence of any such class of white men. The only Indians liable to unite with them in war are some living on the Koskoquien, and a band called Too-clok, who live on a river of the same name, which empties into the Tanana from the west, about 150 miles from its mouth. Indian allies against them could, probably, not be obtained in this section of country.

The seasons would affect military operations in their country considerably, for in the summer ordinary clothing could be worn, while provision would have to be made against the extreme winter cold by providing troops operating against them with garments of fur, which are made and sold by the natives living near the mouth of the Yukon. All the rivers freeze over, so that transportation by water has necessarily to be abandoned and resort had to sleds drawn by dogs, which latter can be obtained in sufficient numbers throughout the whole region. Besides the fur clothes, an ample supply of mosquito bars should be carried as a little protection against those pests.

The appearance of a body of troops with authority to do with this and many other tribes as it pleased would have a very wholesome effect, as there are a number of murderers unpunished, who, if properly punished for their misdeeds, would insure the good behavior of the remainder of the tribe for some time to come.

About two years ago a Mr. Bean ascended the river a short distance and settled there for the purpose of trading. He was accompanied by his wife, and one morning while they were sitting at breakfast, a shot was fired through the crack of the door, killing the woman almost instantly. The motive for the deed was never exactly understood, as no difficulty of any sort had occurred, and the Indians were all very fond of both parties. The Indians said that the shaman, through some influence or other, had conceived the idea that for the good of all a white man must be killed, and so instigated the murder. The man who did the actual shooting was turned over to the only trader in the neighborhood after he was captured, but the trader, being afraid of a reaction afterwards if the man were punished, did not care to take the law into his own hands, and in consequence, gave him his liberty.

INGALIK TRIBES.

This name is given to the various families living along the Yukon River and its tributaries, below the so-called "Ramparts," and extending about 400 miles down the river. As regards the exact limits either way, it is of course very difficult, if not altogether impossible, to mark them, for those bands living in close communication with those of entirely distinct families by long intercourse gradually adopt certain ways of living and other improvements in different things over those in vogue among themselves. In consequence of this different authors would be apt to mark the limits at different places, according to the minuteness with which they had observed the smallest details in their everyday life.

From Mr. Frederickson, a trader who has been thirteen years in the territory, it is learned that the last Ingalik village is about 40 miles below the settlement called Anvik. Among the tribes living within this section already defined there are one or two which do not coincide in every particular with the Ingaliks proper, a fact which will be noticed farther on in speaking of them individually; but they are so similar in manner of living and customs, and occupy regions so contiguous, that in this description very little regard will be paid to the minute and delicate distinctions which could be of no service in any other than a strictly scientific sense.

The country which they occupy is generally mountainous on each side of the river, well covered with timber, principally spruce, poplar, and birch, and consists mainly of rolling plains, allied to the tundra, so called, of Siberia, except that more or less timber abounds, as mentioned before; the ground is everywhere covered with a thick grass or moss, which remains very wet and soggy all the year around, and presents great difficulties to travel unless, as it is during many months of the year, thickly covered with snow. This moss, remaining so wet, is a poor conductor of heat; consequently it protects the soil beneath from the rays of the sun during the few months that it shines brightly, so that the frozen ground does not thaw out at all. With this condition of affairs it can hardly be said to be fertile, though by constant care and considerable work in digging ditches for purposes of draining, certain varieties of produce can be raised.

At Nuklukoyet, a trading station situated on the river, a few miles below the mouth of the Tanana, Mr. Harper, the trader there, had a garden fenced off, in which, without very much care or attention, he had succeeded in producing turnips of large size and of excellent flavor. No other vegetable of any sort had been planted, but he thought that any of the hardier varieties could likewise be made to flourish and show favorable results.

Several tributaries join the main river along this section, none of which, however, except the Tanana, are of any great size. The Koyukun comes in from the north, and is interesting in the fact that not only quite a large band lives along its banks, but from its headwaters a portage of no considerable length is made to the seacoast at Kotzebue Sound. Across this portage trading goods of different kinds were interchanged between the Innuits of the coast and these interior Indians. Among other things, liquor, originally obtained from whalers and other trading vessels, was disposed of to the Koyukuns, who thus became addicted to the use of alcohol before many of their brethren, and from this fact they have acquired considerable notoriety through many difficulties growing out of drunken sprees. Many of these disputes were of course trifling in character, but others were accompanied by fatal altercations.

Some distance to the westward of the mouth of the Koyukun is the Kaltag River, a small but very clear stream, which flows in a southeasterly direction, heading up in close proximity to the source of the Oonalakleet River, which flows into the sea. During the time of the Russian occupation, when Nulato, situated a short distance above the mouth of the Kaltag, was a trading post of considerable importance, the journey between it and St. Michael was most conveniently accomplished by means of these two rivers. This was more particularly the case in winter, when both streams were frozen over and the country generally covered with snow.

The distance between St. Michael and the Oonalakleet is about 40 miles, and is made in canoes along the shores of Norton Sound, or in sleds, according to the season of the year. The river is then ascended to a certain point, where a crossing is made to the Kaltag, and that river is then traveled down to its mouth, from which point it is about 40 miles to Nulato. Somewhat farther

down the river the Anvik, a very swift stream, enters from the north, and a portage across country to St. Michael is also made from near the headwaters of this stream, occupying generally about five or six days, but a good Indian can make the distance in summer in three.

These rivers are the only ones of importance, not on account of their size, as the Kaltag is a very small stream, but as affording a means of communication, and one that is practicable, between the coast and the different tribes who live along this portion of the river. If resort had to be made to the journey by way of the mouth of the river, especially in entering the country, much more time would be consumed; though for the transportation of a large number of men this way would be more practicable.

The principal game found in this region is moose, reindeer, and many different varieties of water fowl, such as ducks, geese, swans, etc.

During the winter the larger game is hunted, and furnishes the inhabitants their chief support in the way of fresh meat. Early in the spring the water fowl put in an appearance, and later on the fish begin to run in considerable quantities in the river. Salmon are caught in considerable numbers, but the chief reliance is in a smaller variety, called whitefish, which is obtained in greater quantities and during a longer time. Just before the breaking up of winter, before the water fowl put in an appearance, there is a season when it is almost impossible to obtain sufficient food of any kind to satisfy the ordinary wants, and the inhabitants, being naturally very improvident, do not profit by past sufferings to store up sufficient to do them during this bad season; consequently in the past, more than at present, many have died from actual starvation.

In regard to the whole number of people comprised under the heading of Ingaliks, it is very difficult to give an estimate which would approximate the truth, on account of the large tract of country occupied by them and the great number of separate villages. In one census report the number is given as about 1,250, and as many as six villages are mentioned as containing a population of over 100, while one is spoken of as containing 700. These estimates were made from the steamboat as it ascended the river, when individuals from all around assembled at different points; so that while, of course, giving a fair idea of the whole number in the region, it overestimates the number of occupants of each village; and as these are in every respect distinct from each other, much perplexity would be occasioned in the event of any disturbance arising. Though not having sufficient time to examine minutely concerning the number of inhabitants in each village, yet as our approach was, as a rule, quiet, and in every way unexpected, we did not pass a single village that could accommodate as many as 100; and as it was more often the case that the inhabitants were away than collected together, the villages almost invariably presented a very deserted appearance. The whole number may be estimated safely as between 1,200 and 1,500, divided among different bands, leading lives independent of each other, except the interchange of certain articles in trade. The relations are generally friendly in most respects, but in the event of a difficulty of one division with the whites none of the others would join this one out of pure friendship, unless the matter in dispute were one which concerned all of them as a people. Such a disturbance at present could only grow out of some trading interest, as that is almost the only industry which throws them in contact with the whites; in fact, with a very few exceptions, the only whites who have ever been in this region have been induced by prospects of large profits in disposing of their goods to the natives.

The only miners who have prospected this region are a party who wintered there during 1882, and they not only found the chances of becoming suddenly wealthy far from flattering, but are said to have been actually driven out of the country by the myriads of mosquitoes which swarm in such numbers during the summer season. To give something of an idea of the numbers and annoyance occasioned by these insects, it is stated as a fact by men who have been in the country any time that animals are often killed by them, and an argument in proof of the veracity of this statement is shown by the great sores which are produced on dogs when chained in one place for any length of time.

Many of the natives take advantage of the civilized improvements—in the shape of mosquito netting, for instance, which they use as a veil, wearing it coiled around their hats when not in

use. As regards these Ingaliks as a class, they are, as a rule, of average height, tolerably well built, but slender, differing in this respect from the natives farther down the river. They have long black hair and a complexion brown by nature, but often verging toward black on account of a liberal covering of dirt. In character they are generally pretty brave, but by no means inclined to war, and are not so upright or honorable as to hesitate to take an unfair advantage of an enemy. Avarice is a prominent trait in their character, and they do not seem to have very much affection except perhaps for their children.

On account of the cold and damp climate, and the constant exposure to which the children are subjected on account of a lack of sufficient clothing, pulmonary diseases of various kinds are very prevalent. Many die of pneumonia, it is said, during the winter, and they all have an appearance as if inclined to consumption. Whooping cough is very prevalent among the children, which of itself, and with the sequelæ, causes the death of a number.

Last winter there was a severe epidemic of some throat disease, presumably diphtheria, as well as could be ascertained from the different descriptions. This completely desolated some families, and was particularly fatal among the younger members. All along the river numerous and recent graves were seen, often as if inclosing the bodies of whole families, judging from the amount of space included within the rough fence.

These natives are quite industrious, and, as a rule, willing to work, but as there is not much demand for their services they do not find much employment among the whites. They are active traders, doing much business, as it were, with the Innuits living down the river and on the coast. They exchange certain wooden utensils, skins (principally wolverine for trimming garments), canoes, and other articles for oil and skins of the tame reindeer, obtained in trade principally from the natives of Asia. The canoes, which they use themselves and trade to the lower river Indians, are made of birch bark, similar in many respects to those in use by the Indians living nearer the head waters of the river, but they are far more substantially built and not so well modeled. They have to be built on firmer frames on account of being used on rougher water; for the river spreading out in this lower country affords ample space for the wind to create considerable commotion in the water, which would prove disastrous to any craft less substantially made. These canoes afford them during the summer almost their only means of communication, although one of the large skin boats of the Innuits, called a "bidarra" by the Russians, is occasionally seen in use among them. These are propelled by means of paddles and sails and are capable of carrying immense loads.

During the winter, which in reality is the season when they do most of their traveling, their reliance for transportation of their property, as well as themselves, is in their dogs, which are capable of making very long journeys without requiring very much food. The dog is the only domestic animal found among them, and, as is seen, answers their purpose far better than the horse or any other draft animal.

In the section of country occupied by these natives there are two white men permanently settled for the purpose of trading with them. One at Nuklukayet, or, more properly, Tanana Station (the first name being that of an abandoned post situated a short distance up the river), supplies the lower Tanana district and all the region up and down on each side of the river for a considerable distance.

The Indians generally come in early in the year, so that they are very often collected about the post at one time to the number of 400 or more, and occupy their time in dances and celebrations of all kinds. At other times during the year single individuals come in, obtain what they require, and leave, so that as a general thing the post and its surroundings have more of a deserted appearance than otherwise.

The other trading post is at Anvik, which supplies the natives living along the Anvik River, the Shageluk section, and the country along the river, both up and down. The larger portion of the trading material is brought up on the steamboat at the time of its annual trip in the summer, although some little, especially articles of food, is brought over the different portages by means of dogs and sleds in winter. From these places the natives obtain their supply of ammunition

and other articles, such as cloth of various kinds, for making their clothes, which are in pattern such as are worn by civilized people during the warm weather.

In winter they wear clothes of reindeer skins, which, as stated before, are generally obtained from the natives living nearer the mouth of the river, who seem to be much more expert in the manufacture of their clothing than the Ingaliks. Should these two places be abandoned, the only other sources of obtaining useful articles would be from whites living farther down, directly, or through other Indians.

Considerable flour is disposed of to these people, who in many ways have adopted different civilized improvements. All their uncouth and rude cooking utensils have been very generally set aside, and those obtained from the whites adopted in their places. Tea and tobacco are the articles most sought after, and it is the rarest exception for a trade to fall through if either of those articles be offered in exchange for what is considered as an equivalent in value. The habit of drinking tea was acquired during the Russian occupation, and this race has left its imprint on the inhabitants in many other ways. Wherever the Russians had settlements many of the natives were employed by them, and they were invariably treated with the utmost harshness and cruelty, and had it not been from fear many and serious difficulties would have occurred; in fact many murders were indeed committed, oftentimes innocent parties being the victims.

The subdivisions of these Ingaliks are not made, generally, with any regard to a difference in the habits, customs, ceremonies, etc., as they are all very much alike in these respects, but simply from the different parts of the river which they occupy have they derived different names. For instance, those about Nuklukayet are known by the same name, and so on with the Kaltags, Nulatos, Shageluks, Anviks, etc. As regards those natives living along the Koyukun River, and called by that name, they, by some authors, are not considered as belonging to the Ingaliks, although they speak the same language and resemble them in very many respects. They are, however, considered more warlike, which might be from the fact of their leading a more active life, and by some are considered the most attractive looking Indians of this portion of the country. This last consideration, of course, is a mere matter of fancy, and they might be far more pleasing to the eye than many others without even then producing a favorable impression.

Each subdivision, or more strictly speaking each village, has its head chief, who is, however, not looked up to with the same veneration as among other tribes, for these people, being very superstitious, have far more respect for the medicine man, or shamans as they are called among them. These individuals are generally very shrewd, and exercise their talents in curing disease, not for the good of the people, but as a means of living for themselves, consequently they are oftentimes very unscrupulous, and with such superstitious minds to work on, often do a great deal of harm on account of thus practicing their tricks and mysteries as a trade; bribes, if judiciously offered, would undoubtedly accomplish all that was required.

The habitations which are occupied by the people are quite substantially built of logs and hewn timber, generally near the water, and are only partially bullet proof; some are partially underground, the last named being met with more and more frequently as you approach the region occupied by the Innuits, from whom they have undoubtedly acquired this method of building. The language spoken by the Ingaliks is one peculiar to themselves, and in reality is the main mark of distinction between them and the natives living both above and below them. Many of them have learned considerable of the Russian language, which, combined with their own tongue, forms a patois which is employed in trading. No attempt has been made to improve the condition of these natives by the establishment of schools before or since the departure of the Russians, so that even now they continue to live as ignorant as at the time of their earliest intercourse with the whites. Very little advancement has been made in the way of Christianity, although priests of the Greek Church have been among them since the earliest times; yet the natives, while always desirous of being baptized and reckoned as true converts to the faith, nevertheless have not the smallest idea of what it all means, and, in consequence, no beneficial results accrue, such as an improvement in moral tone, etc.

An episode which occurred last year will give a very fair idea of what changes are made on

these savage minds by prospective salvation. A Russian priest came up from the mission to Anvik with the purpose of baptizing a number of Indians, who were to come down from the Shageluk village above and meet him. Previous to this time there had been two trading companies on the river, and one being only just withdrawn the prices given for furs were necessarily immediately lowered, which fact created much feeling among these Indians. As they were to meet the priest at Anvik, it was considered an excellent opportunity to take revenge on the trader at the same time; consequently a plot was arranged by which means several of the men were to be admitted to the store at the same time. The trader was to be bound, and perhaps killed, and the store plundered. Fortunately the plan was disclosed by the Anvik Indians, who refused to lend their aid, and the Indians, finding the trader warned, decided not to make any such attempt. Any outbreak by these men would be in some such underhand way, for a single determined white man can intimidate any number, provided they do not obtain an unexpected advantage. At present, except perhaps in certain matters concerning the disposal of furs, the most friendly relations exist between these Indians and the whites residing in and passing through their country. Several murders are recorded, the most atrocious being the massacre at Nulato in 1851 by the Koyukuns, which is spoken of as being brought on by the blunt manners of a lieutenant in the English navy.

In reality the Indians had been jealous of the whites establishing themselves permanently among them, and had manifested this feeling on two or three different occasions by destroying the improvements made during the summer by the Russians and abandoned in winter. In 1851, ten years after the post had been established at Nulato, Lieut. J. J. Barnard arrived there in search of information concerning the lost Franklin party, he being a member of an expedition sent out for that purpose. Instead of politely requesting an audience of an influential chief of the Koyukuns, he sent for him, which was considered an indignity by the chief, who immediately set about to obtain satisfaction for the insult. Before arriving at the station a Russian and an Indian companion were killed and said to be eaten, after which, before the attack was made on the whites, the native village near by was set on fire, and the inhabitants shot with arrows as they ran from their houses. Notwithstanding all the noise of this the whites were not aroused, and the commander as well as Lieutenant Barnard were killed almost in their beds in attacking the room occupied by two Russian workmen; one of their number being killed created a panic among them, and they thereupon departed. Lieutenant Barnard died before aid could arrive from St. Michael rédoubt, and his grave is now seen a short distance to the rear of the old post, which consists now of two or three log houses partially fallen down. Last year a Russian was killed by an Indian living at Nulato, and the murderer still goes unpunished, though in constant fear of being killed or otherwise injured by the whites. This murder, though by no means justifiable, is nevertheless accompanied with circumstances more or less extenuating. The Russian, whose name was Ivan Kogenikoff, was held in great fear by all the Indians, not only on account of his naturally quarrelsome disposition, but on account of the very summary manner in which he had avenged a murder occurring farther down the river some years ago, and many of them would have been delighted at the prospect of disposing of him had they dared. One night he was being literally dragged home in a helpless state of intoxication by an Indian whose brother had been killed by a son of Kogenikoff. The Indian, seeing him so utterly helpless and so completely in his power, struck him on the head with an ax, considering the deed justifiable in revenge for the death of his brother.

Bows and arrows have been utterly abandoned by these tribes, who are provided, generally, with double-barreled shotguns of small caliber, in which a bullet may be used.

INNUIT TRIBES.

This is a name given to themselves by all the natives, who are more commonly spoken of as Eskimo, and as they extend all along the shore of the Arctic Ocean, as well as along the western coast of Alaska south to Mount St. Elias, they necessarily consist of a great number of divisions.

These various branches resemble each other in many particulars, but likewise differ in other

respects, according to the country which they occupy and the different pursuits followed in obtaining food, etc. They differ widely from the natives of the interior, who are spoken of as Indians, not only in customs, habits, manner of living, etc., but even in their anatomy, showing conclusively that they belong to an entirely different family. Men versed in the science of ethnology, on picking up the skull of one of this family, can distinguish it instantly from an Indian skull.

As many as seventeen or eighteen different tribes are mentioned as dwelling along the western coast of Alaska from the neighborhood of the Copper River, including those inhabiting the various islands in Bering Sea and Straits. Of these divisions those living on the island of Kadiak are the most powerful and at the same time comprise more inhabitants than any other along the coast. They were formerly considered as Aleuts. But at the time of the first visitors appearing among them they were carrying on an active warfare with the natives dwelling on the Aleutian Islands, and differ from them in energy and spirit, being very much less influenced by contact with the Russians than many of the other tribes.

Between the island of Kadiak and the Yukon delta six different tribes are mentioned as occupying the intervening country; they resemble each other very closely, and only differ in certain minute particulars, principally in their vocabularies, certain words being substituted, and slight changes in the terminations of other words being found.

Those tribes living near the mouth of the different rivers have ascended these streams to variable distances, as is seen in the case of the so-called Ekogmuts or Ikvogmutes, as they are sometimes called. These natives inhabit the Yukon delta, and are found along the river a distance of about 300 miles from its mouth. The village of Manki, or Makeymute, situated about 40 miles below Anvik, is the most inland village of the Innuits, and is the dividing line between them and the Ingaliks.

The tribes along the shore of Norton Sound are called Mahlemuts and Unaligmuts or Unaleets, and are important in the fact of their living in the neighborhood of St. Michael and having been thrown in direct intercourse with the whites, both Russian and American, since the establishment of a post at that place. The term "Mahlemut" is often applied to all the Innuits, both along the river and vicinity of St. Michael as well.

In regard to the general characteristics of these different tribes, it may be stated that their complexions are brown, not the copper color generally ascribed to the Indian, this color being influenced in shade, more or less, by exposure to the sun and by a lack of proper attention to regular bathing. They are generally of average height, very often exceeding this, and the men are well built and possess great muscular power, enabling them to lift almost incredible loads. As a rule they are good-natured, willing to work, and are not easily made angry. They are not warlike, and as a rule are very cowardly indeed, being not only in great fear of the Indians of the interior, but they have the greatest respect for the whites in certain villages where there has been a trader among them. One determined man can do exactly as he pleases, as is shown by the high-handed treatment to which they are at times subjected. It is said that on the mysterious disappearance of any article the trader would start through the village with a whip, slashing here and there until the article was returned. This undoubtedly is somewhat exaggerated, though they have very much more respect for a man of this kind, being accustomed to such treatment ever since their first intercourse with white people. A peculiarity of these Innuits is the growth of hair on the face and body; forming a striking contrast in this respect with other native tribes.

The tribe living on the Yukon is said to differ in this respect more markedly than any other, many of the men having very heavy mustaches and beards. The singular custom of wearing labrets is in vogue among them. A hole is pierced on each side of the lower lip, just below the angle of the mouth, and through this is worn some sort of ornament of bone, ivory or stone. This prevails among the men, while the women adorn themselves by tattooing the chin, which is often the only means of telling them from the men, except, perhaps, the cut of their fur garments. As a general rule the kind of clothing in use among them since the earliest times is retained by them, instead of adopting the civilized garments, which, at best, could only be used with any degree of comfort during the summer. These native garments consist of a coat made

of reindeer skin, and extending almost to the knee, with a hood to be thrown over the head, with a trimming, generally of wolf or other long fur, which answers as a protection to the face against the wind. Breeches are worn below this, which are continuous with the foot covering in the female garment, but separate as worn by the men. The boots are made entirely of deerskin except the soles, which are of the thick skin of the seal, and capable of withstanding considerable wear. These are worn with a thick layer of cloth or straw around and beneath the foot to absorb the moisture and protect the sole from injury when stepping on rough ground, etc. A certain kind of boot for use in the water is found among them, made of seal or fish skin, which is almost, if not fully, as impervious as those made of rubber by more civilized people. In regard to the coat called a "parkee" by the whites dwelling in the country, the only difference between that worn by the women and the men is the way it is shaped at the bottom. That for the men is cut almost straight around, while the other is cut up at the side, forming a semi-circular flap extending below the knee in front and behind.

White men living in the country, when exposing themselves to the climate in journeys among the different villages, invariably use these parkees, the custom being, as with the natives, to wear two; the one nearest the skin having the fur side in, while the reverse is practiced with the outer one.

The country along the river, which is occupied by these natives, does not differ materially from that farther up, except in the timber. Trees of considerable size gradually disappear until small shrubs only remain, and down toward the region of the delta everything in the way of trees disappears, presenting nothing to the eye except a broad expanse of country. This consists everywhere of a marshy prairie land, known as tundra, thickly covered with moss and only fertile to a small extent, even after much care is taken to drain it.

On the island of St. Michael, where a trading station has been established for many years, vegetables of different kinds are produced, such as turnips, radishes, and lettuce. The soil here does not differ from that along the lower portion of the river, except it may be less moist, so these same vegetables ought to succeed as well there if the same attention be paid to their cultivation.

Along the left bank of the river the country is everywhere flat, while a chain of hills extends along the right bank almost to the delta, which seems to have the effect of turning the river away from the point where it would naturally seek the sea, and bending it for some little distance to the south.

These natives occupy permanent villages, situated, in the case of the Ekogmuts along the river and built close to the water's edge. The houses are of two kinds, one for use in summer and the other to be occupied when the weather is colder. The former are built mostly above ground, of logs and hewn timber, with the roof generally more or less covered with dirt, with a hole in the center for the passage of smoke. The winter houses are built of logs, either entirely underground, as when built on the side of a hill, which is a favorite site, or covered entirely with earth piled up around them. The entrance consists of a hole just large enough to accommodate a human being on his hands and knees, which is closed by means of a skin of some sort to keep out the cold. The approach to this is by means of a covered hallway, as it were, which answers the same purpose as a storm door in use in cold civilized countries. The summer houses would be only partially bullet-proof, while the true barraboras last described would undoubtedly resist the passage of such small missiles. But if anything like artillery were employed against them they would necessarily have to be abandoned.

The villages of the coast tribes are generally situated near the mouths of rivers or in some sheltered bay or cove, close to the water, thus conveniently placed for fishing and communication in their boats. Several different varieties of canoe or boat are in use among them, which are used according to what is to be accomplished and the character of the water near their villages.

Along the river a strongly built and well-braced birch-bark canoe is used, generally of such a size as to accommodate only a single man, though some are of larger build. These are built by the Ingaliks living farther up the river, and traded to them in exchange for seal skins, oil, walrus hide for making rope, etc. Besides these canoes there are other varieties peculiar to the

Innuits, which are the only ones used by the natives who dwell in the immediate vicinity of the sea. One is a regular boat, consisting of a heavy framework of wood bound together with hide and covered with seal skins, which are carefully prepared, nicely oiled, and sewed together; the other is of smaller build, but constructed on the same principle, except that it is everywhere covered in with the seal skin, only a single hole being left in the middle for the occupant. The former is known by the Russians as a bidarra, and is very useful in carrying freight, etc., while the latter, called "kyak" by the natives themselves, is known as a bidarka among the Russians.

A modification of the kyak is often seen copied, it is said, from the Aleuts, consisting of an exactly similar construction, but with two or three holes for the accommodation of that many individuals. Both varieties are extremely serviceable, especially in making journeys which are not prolonged, for after some service the skin becomes soaked and the boat has to be taken out of the water and allowed to dry. Considerable practice is required to even sit in one of the kyaks without turning over, but to one accustomed to their use journeys can be made in the roughest kind of water, and a very fair rate of speed be maintained without extraordinary exertion. Both a single and double bladed paddle are used in propelling these kyaks, while resort is often had to a sail when traveling in the bidarras.

Many wonderful anecdotes are told of the feats of seamanship performed by these natives, who wear, when in rough water or when it rains, a waterproof shirt, which is fastened to the rim of the hole in which he sits, thus preventing any water from entering the canoe. Some are said to be able to turn completely over, bottom upward, and right themselves by means of their paddles. Though not prepared for this performance they are very liable to be drowned on account of their feet and legs being confined in the boat, as happened to an individual who was rescued from such a predicament shortly before our arrival at St. Michael.

Stories are also told of some being actually thrown, by way of sport, from the top of high rocks into the water, and by a skillful use of the paddle coming up safely again only to repeat the performance. Their only means of communication in winter is by sleds drawn by dogs, which are able to travel very considerable distances without requiring very much food. The dog is the only domestic animal found among them, and, as is seen, he answers every purpose for which a draft animal is useful among civilized people and does not require any care whatever in keeping.

In regard to the whole number of natives of this family living on the Yukon River, they are variously estimated by different authors; one census report puts the number at 1,333, which does not include those living within the delta of the river. This is approximately true, being somewhat in excess of the actual number if anything. In the delta proper there are probably about 300 souls, and between this point and the farthest village of the Mahlemuts there are undoubtedly as many more. Among these those capable of bearing arms are provided with weapons of some description. The gun most universally seen is a long, double-barreled shotgun of small caliber, in which both shot and bullet may be used, according to the nature of the game hunted.

Along the Lower Yukon large game is not found to any great extent, reindeer and bears being about the only animals hunted, but there is the greatest quantity of water fowl. Ducks, geese, and swans, of almost every variety, breed all along the river in fact, but the delta seems to be a favorite resort for the geese, which are killed in great numbers and are salted, in barrels, by the white residents for winter consumption. The natives rely almost entirely on fish, both fresh and dried, which furnishes them their chief article of food, and provision is made for winter by storing away sufficient quantities of the dried article to last the season through. The custom prevails among the river natives to bury the fish and allow them to remain there until sufficiently putrid to suit their taste, when they are eaten with a great deal of relish. The coast natives vary their diet of fish with not only reindeer, but with seal meat and oil.

Walrus are not found in any numbers along this portion of the coast, so that no reliance is placed on them for food. The beluga, or white whale, is killed in considerable numbers near the mouth of the Yukon. This is a small whale, which enters the shallow water for breeding purposes, and when the tide falls the natives attack it, and secure a great many without much labor. The flesh is eaten, and the oil and blubber also preserved for food and to be burned in

their rude lamps, which consist of a small open vessel containing oil, into which a wick of moss or cloth is dipped and a light applied. The amount of light secured from each does not in any way compare with the brilliancy of a tallow candle, and the odor which is generated by the burning oil is far from agreeable, especially when confined to the close limits of one of their underground houses.

These tribes have no chief in the strict sense of the term, although there are individuals among them who exercise more or less influence through accumulated wealth or otherwise without necessarily being endowed with the spiritual powers which the shamans are supposed to possess. With no real head, they have not the unity of the majority of Indian tribes; consequently, in the event of hostilities, do not all combine with the same readiness.

Many superstitions prevail among them, and the utmost confidence is placed in the sayings and predictions of the shamans, who resort to all kinds of devices in the way of sleight-of-hand performances to make their acts more mysterious. As a compliment to one of these individuals, he was asked to predict how long we would have to wait at St. Michael Rédoubt before the arrival of the schooner *Leo*. The reply was made that if on a certain evening we would go to the village he would invoke the spiritual aid and relieve our minds of any anxiety. On the evening in question we assembled at the "Casine," a public building, built on the same principle as the dwelling houses, with one of which every village is provided, and, after many of the natives had seated themselves around, the shaman, accompanied by a monotonous singing and drum beating, began to call in the aid of the spirits. Finally, when everything was ready, a small blue bead was taken, crushed, and sent toward the schooner, the announcement being made at the same time, if the bead returned whole the vessel had been reached. A bead was resurrected shortly afterwards, unfortunately of a different size and shape, which, however, was not observed by the natives present, and the answer obtained from it was that the arrival would happen before another moon, or some such indefinite and Delphian-like response. Several other tricks were performed of a more childish nature even; so plain were they in fact that it seems really incredible that the simplest-minded native could be deceived by them.

There are very few whites dwelling in the country occupied by these tribes, and they for the most part are traders who are employed by the Alaska Commercial Company. At the Mission, a village on the river, only a short distance below Anvik, there is a store kept by an Aleut, the brother of the Greek priest, who also had a church here. From this point supplies are obtained by all the natives living above and below on the river. The chief articles which are sought after in trade are tea and tobacco, though considerable flour is also sold and many other plain articles in the way of cloth, cheap hats, etc.

The only sources for ammunition are the different stations along the river, which, in the event of any difficulty with our own Government, would be denied them. Some miles below the Mission is another post, formerly occupied by the Russians, which is known as Andreievsky. This is the home of a trader, who in winter has been accustomed to make long journeys among the different villages, about the Yukon delta, disposing of various articles in exchange for furs.

Near the very western limit of the Uphoon mouth is Koatlik, a very small village indeed, but the home of an old Russian who has the usual amount of trading material. About 70 miles north of the Uphoon mouth, which is the one generally, if not always, employed by the whites, is the island of St. Michael, on the eastern end of which is a settlement of the same name, established by the Russians in 1833. The site for a settlement has many drawbacks—first and foremost, the lack of water, the supply being brought in boats from the mainland, a distance of 3 miles, and a scarcity of fuel; but it has the advantage of being in a sheltered bay and the nearest point to the mouth of the Yukon, which vessels of even average draft can approach, on account of the extensive shoal, formed by deposits brought down by the river. This place is the headquarters of the trading company, and the depot of all supplies, guns, ammunition, etc., that are taken into the river and disposed of to the natives living along the coast adjacent, and would necessarily be an objective point were the motive prompting an outbreak one of robbery. The natives, as a rule, are very kindly disposed toward the whites, and although many threatened attacks are often spoken of, none of late years have been made. These are generally agitated

after a free indulgence in liquor, which is occasionally obtained from whalers and other vessels, or at the instigation of some individual who has been thrashed for stealing or has suffered some imaginary wrong.

In 1836 an attack was made on the post, but was repulsed, without any injury being accomplished, by the commander of the fort. The natives indulging in this were the Unaligmuts, who, with the Mahlemuts, are generally a worse class of men than those living on the river, on account of their long intercourse with unscrupulous traders, who make every attempt to obtain the greatest quantity in exchange for the smallest amount of the vilest liquor or other articles equally contraband.

Since the year 1855 it is said that not a single white man has been injured, or even threatened, by the natives on the lower river, who certainly do manifest a spirit of abject submission. At that time there was a considerable Russian settlement at Andreievsky and Ekogmut village near by, many of the inhabitants of which were employed as workmen at the station. Several of the whites had gone on a journey up the river, when the natives attacked the place, while its few inmates were taking the customary steam or hot-air bath, and murdered them as they came out. A boy escaped and finally reached St. Michael, which was temporarily in charge of the Russian kogenikoff, previously spoken of as being murdered last year in the neighborhood of Nulato. He, with one or two others, set out immediately in a small schooner or "barka," as it was called, for the scene of the massacre provided with two howitzers loaded with scraps of iron, nails, etc. He demanded that the murderers be handed over or he would fire on the village. The natives showed no inclination to obey, thinking the guns would not go off, but were soon brought to a realizing sense of their error by the discharge of the guns, which killed a number. The Russians, not satisfied with this, are said to have attacked the remainder with clubs, and to have killed many women and children. The result, though hardly justifying the means, has been very wonderful and of great benefit to the whites who may have occasion to enter the Territory.

As far as a universal outbreak is concerned, such an event could not well occur, as there is not sufficient union among members of any tribe to occasion it, nor are there whites enough in the country to justify it.

In the event of troops entering the country, necessarily by sea, for the punishment of outrages by members of tribes, it is more than likely that the offenders would be immediately given up, or, if not, no other tribe would be willing to bear any portion of the blame, and certainly would not unite with them as allies.

The only unusual campaign supplies would be boats, and if a winter sojourn were made native garments would be required.

ALEUTIANS.

Under this heading is considered a large family, differing in many respects from any before spoken of, which occupies the group of islands extending to the westward from the Alaska Peninsula, and forming a boundary, as it were, between Bering Sea and the Pacific Ocean. There are one or two settlements on the peninsula itself; and the Pribylof group, comprising the islands of St. Paul and St. George, also is inhabited by members of this same family.

In a military sense their consideration is of little importance, for they are more than half civilized, about a fifth of their whole number being half-breeds while many others have necessarily more or less white blood in their veins. They are, however, connected with the most lucrative and chief commercial interests of the entire Territory, namely, the fur seal and sea otter, and being met with on our returning by sea will be spoken of in this connection as completing the various different tribes living in the country which we met.

The word "Aleut" is of obscure origin, not belonging, it is said, to their language, but derived from some other dialect, how or when it first came into use being unknown. The name formerly used by themselves in being translated signifies "men of the east." Among all of the tribes throughout the Territory of Alaska this one family has not only been longer in direct

intercourse with white men, but has been more thoroughly changed from their original condition than any others. Before the arrival of the Russians among them they are said to have been full of life and spirit, and fond of all sorts of enjoyments; whereas now on account of the cruel treatment to which they were subjected, being looked upon and treated as mere slaves, their spirit seems broken and their character completely changed. With all this came likewise a complete change in habits and customs and religion even, for they are said to have had certain ceremonies which resembled a religion more closely than that of any other tribes. Their condition, indeed, is bettered no doubt by the civilizing influences, but the same result might have been accomplished by less heroic measures. They were savages undoubtedly before their first intercourse with the Russians, and had manners and habits which could not be considered otherwise, as for instance, their dwellings. These were built entirely under ground and of a sufficient capacity to accommodate as many as 200 or more people, families being divided off from each other by means of very rude partitions. Entrance was effected through the roof, by means of ladders, one house being provided with several such means of entry. Being so protected from the wind and cold, these houses were necessarily very warm, so confined, in fact, that no clothes were required, and the inhabitants are said to have gone about for the most part entirely naked. Their food consisted of fish of various kinds, flesh of the seal and sea otter, whale blubber, seaweed, wild parsnips, different sorts of berries, etc.

Certain records and legends of the Russians and the people themselves would tend to show that they numbered at one time as many as 25,000 souls, which is probably too high an estimate, the best authorities considering that at no time could they have numbered more than 10,000 at the most. Their many dances and peculiar festivals, as described by Bruiaminov, a very earnest and hard-working Russian bishop, are especially interesting, inasmuch as all the masks and other relics used in their celebration have been destroyed, whenever found, by the Russian priest, so that now the object or idea involved is more or less wrapped in obscurity. The Aleut is of average size, perhaps rather below the medium, with an expression of countenance generally described as pertaining to the Japanese. The complexion is of light brown, hair black and coarse, and the beard generally scanty. As a general thing their chests and arms are well proportioned, while their legs, from the position which they assume so constantly in their skin boats, are often somewhat curved. They are willing to work, and, except when under the influence of liquor, the desire for which is one of their failings, they are mild, good-tempered, and in every respect pleasant to have dealings with. Though much addicted to the use of liquor, and as a general thing craving it on all occasions, crimes of a serious nature are of very rare occurrence, and that of murder is scarcely known. Formerly the number of wives was not limited, the most influential and respected (and they were the best hunters) having the greatest number. Their ideas of anything like marriage, as is the case with almost of the Innuit tribes, were very crude, and the wife or wives were generally at the disposal of visitors or guests. At the present time they have only one wife, and they live together with their families in separate houses. In settlements where there are white people dwelling, small huts of civilized build are generally used, though the barrabara or underground house is very much in use, especially in remote villages.

Their original native dress is described as consisting of a coat or parkee, made with tight sleeves and sufficiently long to reach below the knees, of some sort of fur or bird skins. No trousers were worn, but the boots came up to the knees. In wet weather a sort of waterproof shirt made of the intestines of the sea lion is still worn by them. Besides this last-mentioned garment, the original native dress has been discarded everywhere and civilized clothes adopted, except in a few instances, where the poverty of the individual will not admit of such an expenditure. This is especially the case at those villages where the whites have settled. And as it is through the efforts of the natives that the fur-bearing animals are secured, every aid and encouragement possible is given them.

Schools were established among them years ago by certain Russian priests who were more earnest in their work than some others, so that some few learned to read and write. Bishop Vruiaminov made an Aleutian grammar, and through this means many have been partially educated. Of late years, though several educated members of their own family have been

admitted into the priesthood, no very rapid strides have been made in the way of education. The inordinate desire for alcoholic stimulants of some sort, as stated before, has been their very worst fault and the greatest drawback toward their making more rapid progress in the right direction.

The introduction of liquor of any sort is prohibited, consequently in order to properly celebrate festive occasions, resort has to be had to a decoction of domestic manufacture. This is made from sugar as a principal ingredient, with the addition of flour, and hops if they can obtain them. The whole is placed in a barrel, tightly closed and then allowed to ferment. As the drink resulting is only made when required, time is not allowed for the fermentation to be completed, but they consume it just as quick as the proper strength is attained, with all its horrible taste.

When an individual returns from a successful hunt he purchases whatever articles he may need in the way of food and clothing, and then invites his friends in to partake of his hospitality, in the form of this home-made beverage. This is the occasion of a big spree, which invariably terminates with violent disputes, though, as stated before, it is said that there is not a single instance recorded of a life being lost or of anyone suffering severe bodily injury, except as a result of a frequent repetition of the same dissipation, and the exposure consequent upon having their senses so blunted as to fail to protect themselves against the weather.

The chief article of food of the people is undoubtedly fish; the various kinds, such as cod, halibut, salmon, and trout, being obtained as they come in season. Besides these there are many waterfowl and shellfish, which serve to vary their diet. Many articles of food are also obtained from traders, such as tea, hard bread, flour, sugar, and other little necessaries, and these have been so long in use that the people would find it very embarrassing to do without them now.

The country inhabited by these people consists, as previously stated, of a long chain of islands extending out into the open sea far to the westward of the mainland of America. The islands vary in size, but resemble each other in their very mountainous character. All are undoubtedly of volcanic origin, on several of which there are craters, which are at the present time considered as active. The various settlements of the people are scattered throughout the group of islands, the most western of all being Chichagov, on the island of Attoo. In former times this village was very prosperous, but is now one of the poorest, in a pecuniary view, of all the settlements, on account of the gradual falling off in numbers of the sea otter. This animal, which furnishes the beautiful and very expensive fur, was originally caught in great numbers in the vicinity of Attoo, and as the exchange of its skin for necessary articles was the only means of living to the natives, they have consequently suffered, having no other resource to fall back on. Had it not been that they are amply supplied by nature with the actual necessities of life in the way of food, such as different kind of fish, starvation would have been imminent. The capture and sale of the sea-otter skins being one of the utmost importance to this section of country, the means of taking them is very interesting, as showing a prominent trait in the Aleutian character, namely, unselfishness.

The animal is generally found on certain banks some distance from the land, and is hunted by a number attacking him on different sides. They start out in their skin boats with provisions sufficient to last them for several days, and when arriving at the place generally frequented by the otter a long line is made of boats and a slow and quiet advance is made. When the animal is discovered, either asleep or quietly swimming about with his nose just above the water, an effort is made to surround him, so that in coming up after diving he may come within the circle of boats. Spears are the weapons used against them, as it is thought the firing of guns would frighten them away entirely. It is rarely the case that the first wound kills him; but the animal soon becomes tired out with the continuous diving, and is then readily secured.

In illustration of the unselfishness of the Aleut it has been the custom to give the skin to the man who strikes the first blow, so that after this the others can have no interest, but nevertheless devote themselves indefatigably in trying to secure the prey. If it can not be determined about the time of the first blow the one hitting nearest the head obtains the prize, and if they are of equal distance, the one on the right is granted the skin.

Between the islands of Attoo and Atka, where the next settlement now stands, there were formerly several on the different islands intervening, but these now have all been abandoned.

The island of Atka was originally a boundary line between two so-called divisions of this tribe, which at present, on account of the admixture of Russian blood and other causes, do not exist; the chief distinction in former times was a difference of dialect, there being certain terminations and words not common to both. This must have been quite marked, for the originator of the grammar, previously spoken of, was obliged to form two, one for use among the residents about Oonalashka and the other for the Atkans.

Quite a large settlement is found on the island of Atka, and the inhabitants are prosperous in consequence of the number of sea otter captured annually in their neighborhood, being thus, as it were, wealthy. They buy many articles of the traders and indulge in many of the civilized luxuries, such as clothes, etc. Among other industries, besides being considered the best and most successful hunters after the otter, they are said not only to surpass every other settlement of this family, but every other race in the world in the manufacture of various baskets and ornaments out of grasses.

During the occupation of the Russians Atka was a place of considerable importance as a central point, but since the transfer of the territory other interests have made a change necessary.

The next settlement to the eastward is situated on Oonimak Island, and is known as Nikolsky. The inhabitants devote themselves chiefly to hunting the sea otter; they are generally quite successful, and in consequence prosperous.

Proceeding in the same direction, Oonalashka Island is next met with, the largest and in many respects the most important of the entire group, inasmuch as on the northern shore, in a very beautiful inlet called Captains Harbor, is situated Ilinlink, or Oonalashka, the headquarters of all the commercial interests of this part of the world. There is a settlement here of about four hundred people, which includes a schoolhouse, church, residence of the priest, custom-house, traders' warehouses and dwellings, and many frame buildings, erected for the use of the natives, besides numerous barraboras. Here is seen almost every sign of civilized improvements, and among other things the novel sight of domestic cattle was presented to us.

The climate is by no means severe in this part of the country, and sufficient grass is found almost all the year through to support stock of any sort. The natives in the vicinity are very much improved by long intercourse with the whites, and it is said that almost half their number are able to read and write—the Aleutian language principally.

Besides this large settlement there are several others of less importance, chiefly on the northwestern coast. The island being so indented and cut up with bays and inlets affords ample space for numerous excellent village sites. Makushin, Koshigin, and Cheruovsky, three small villages to the west of Ilinlink, are closely allied in interests, as sending out each season hunters along with those from the last-named place. The natives are conveyed on one of the company's vessels to Sannakh Island, which is the principal resort for the otter, and when the season is over again brought back to their homes.

To the south of Oonalashka is a small island, on which is the settlement of Borka, whose inhabitants are considered the neatest, most orderly, and cleanest of the whole family. This condition of affairs is said to be due to the influence of an old Russian trader and his wife, who have lived among them for some time and set them this good example.

Between Oonalashka and Oonimak Island on the east there is a pass generally resorted to by vessels in going north. This is sufficiently wide and deep, but on account of numerous small islands and the great rate at which the tide rushes through vessels are often thrown in great danger, especially when wind and tide are opposite. In the vicinity of this pass are the settlements of Akutan, Akoon, and Avatanak. Each is situated on an island of the same name.

An industry among the inhabitants, besides hunting the sea otter, is the capturing of the sea lion, the hide of which is used in making the bidarkas.

The next settlements are in close proximity to the peninsula of Aliaska, being distributed among the different small islands, principally along the southern coast. The largest is called

Belkoosky, situated on the peninsula and in close proximity to the best sea-otter grounds found thoughout this region. The other villages in order of size are Ounga Protassov, Korovinsky, Nikolaievsky, and Vosnessensky. Almost the sole industry is the capture of the sea otter which is obtained in such numbers as to make the inhabitants too luxurious, so that almost all their earnings are squandered as soon as obtained.

Directly north of the island of Oonalashka, a distance of about 200 miles, is situated the Pribilof group, consisting of the islands of St. George and St. Paul. These are inhabited by members of the Aleutian tribe, and their chief occupation is in connection with the capture of the fur seal. All rights, privileges, etc., in regard to the taking of this animal on these islands are under the control of the Alaska Commercial Company, who, in turn, are restricted both in the methods employed and the number annually killed. Agents are employed to carry out the laws of the Government in this respect, although the interests of the company are so closely linked with the killing of a judicious number that in reality the corporation becomes its own guard. The limit of the law is 100,000 young males, but as the demand of the market will not always justify this amount, the number actually killed falls considerably below this each year.

The natives living on these islands have become very civilized, and have adopted many of the improvements of modern life. Their villages are laid out in streets, and besides the schoolhouse, church, and other buildings, consist principally of cottages, which have taken the place, to a great extent, of the barraboras, and a fair condition of neatness everywhere prevails. It is said that the natives now living there are descendants of those formerly brought from the Aleutian group proper by the Russians to conduct their seal interests, as the Pribylof Islands were originally uninhabited. From constant practice and training from their very youth the capture of the seal and skinning and preserving of the skins have been reduced by them to almost a science, so that were the whites deprived of their aid considerable embarrassment would be occasioned.

In regard to the entire number of people included under this heading, they have been estimated at 1,890. This does not include the half-breeds or creoles, as they are called, who of themselves are numbered at 479. The entire number has slowly decreased since the advent of the whites and the introduction of intoxicating liquors.

On account of the dampness of the climate, though never very cold, many of the adults die in the winter of pneumonia, brought on by exposure; and the various other lung diseases are especially prevalent among the children.

In regard to communication between the different islands, their only means, except through the aid of the whites, is their skin boats, which are the only kind used. These, like those in use among the Innuits, consist of a framework of some light wood securely bound together with thongs, and everywhere covered in with dressed skin of the sea lion, a hole being left in the center large enough to accommodate the occupant. Some are built with two or three holes, and resemble the one previously described, except in the number of occupants they are able to contain. These bidarkas, as they are called by the Russians, are very light, and are propelled with great ease and at a considerable rate of speed by means of paddles with a single or double blade, according to the fancy of the individual.

As stated at the beginning of this description, the Aleuts are of little importance in a military sense, as the question of active hostilities is one which will probably never come up, simply on account of the nature of the race. They were so long under the sway of the Russians and were so completely subdued that now no indignity could be put upon them sufficiently harsh to occasion serious resistance.

The men are, as a rule, well provided with arms of some description. Those most frequently observed are a double-barreled shotgun, of small caliber, in which shot or a bullet may be used. Should it ever become necessary to carry on a campaign against this people, troops would necessarily have to be brought to the country in vessels, and as the villages for the most part are situated in the deep and sheltered inlets, a very near approach can, in almost every instance, be effected. Nothing in the way of unusual supplies would be needed, except, perhaps, a number of small boats, which would be greatly aided by a small steam launch as well. Very few of the

houses are substantial enough to resist the passage of bullets, and should heavier missiles be employed their destruction would be only a matter of a short time.

The numerical number of the tribes is as follows:

Tongas, about	600	Tadoosh, about	50
Cape Fox, about	250	Fort Yukons, about	100
Stickeens, about	800	Tanana, about	500
Sitkas, about	1,000	Ingalik tribes, about	1,350
Hootznahoo, about	700	Innuit tribes, about	1,900
Hoonahs, about	700	Aleuts, about	1,890
Auks, about	700		
Chilkats, about	980	Total	11,520

Only those Innuits living along the Yukon River within the delta and northward along the coast to near the Oonalakleet River are included in this list, and about 400 half-breeds (Aleut and Russian) living on the Aleutian group are also excluded.

The whole number of natives met with is, therefore, about 11,520. The tribes met with along the river east of the boundary are:

Tahkeesh	50	Takons	100
Ayans	200	Klatolklins	100

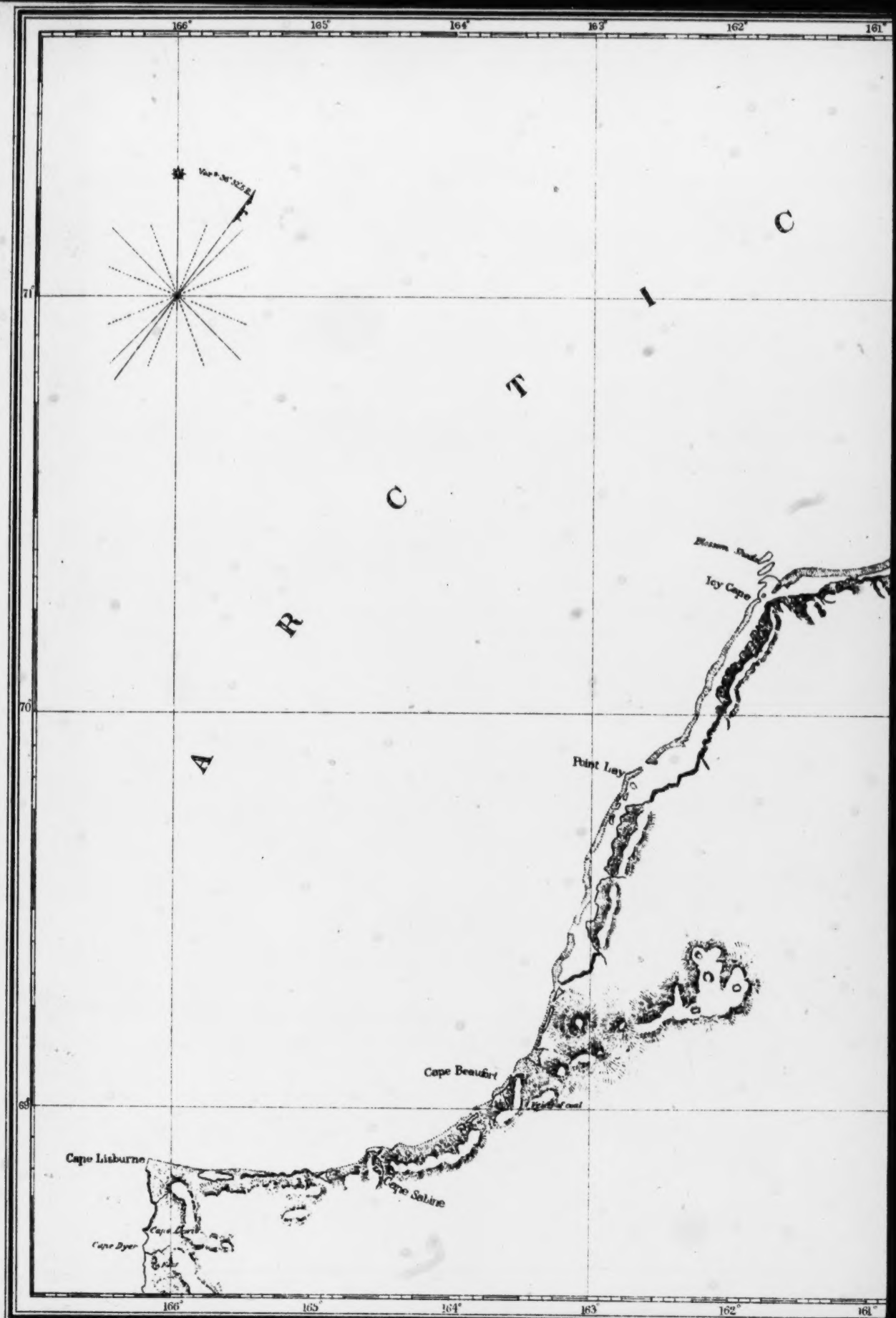
Concerning the last-named tribe it may be stated that their village is but a short distance from the boundary line as determined, and that the trading station about a mile farther down the river, and now abandoned, is within the Territory of Alaska.

ALASKA.—1884.

INTERNATIONAL POLAR EXPEDITION TO POINT BARROW.

Lieutenant P. HENRY RAY, Eighth United States Infantry.

ICE-ARCH, JUNE, 1883.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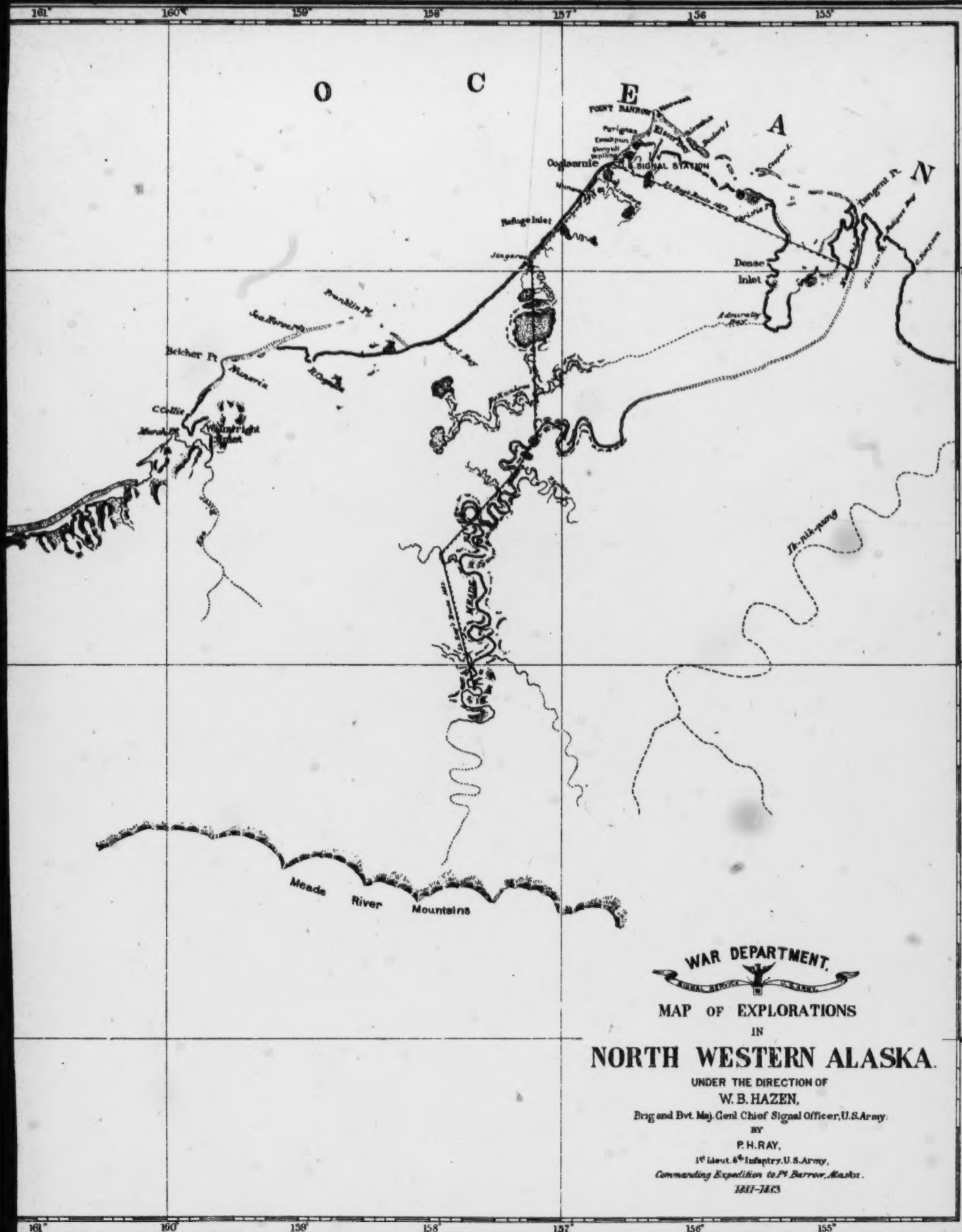


WAR DEPARTMENT.

MAP OF EXPLORATIONS

IN

NORTH WESTERN ALASKA.

UNDER THE DIRECTION OF

W. B. HAZEN,

Brig and Bvt. Maj. Genl. Chief Signal Officer, U.S. Army.

BY

P. H. RAY,

1st Lieut. 6th Infantry, U.S. Army,

Commanding Expedition to Pt. Barrow, Alaska.

1881-1883

S Rep 1023 56 1

INTERNATIONAL POLAR EXPEDITION TO POINT BARROW, ALASKA.

By Lieut. P. HENRY RAY, Eighth United States Infantry.

INTRODUCTION.

At precisely 10 o'clock in the forenoon, and on the 18th day of July, 1881, there sailed from San Francisco, Cal., on the schooner *Golden Fleece*, an expedition fraught, as was believed at that time, and in time it so proved, of momentous importance to the people of the United States and their Government.

The objective point of this expedition was Point Barrow, Alaska; its commander, First Lieut. P. H. Ray, Eighth Infantry, acting signal officer. His instructions were to forward all reports and observations to the chief signal officer charged with the control and supervision of the expedition. He was to establish at Point Barrow a permanent station of observation, to be occupied until the summer of 1884, when he was to return to his former station at Washington, D. C., unless other orders reached him. He was to stop only a few days at Plover Bay for the purpose of determining the area and sea rate of his chronometers.

Before permitting the vessel which carried him on his voyage to return, Lieutenant Ray was instructed to make a careful examination of the vicinity and the exact sites chosen for the permanent station, which was to be located in latitude and longitude chronometrically, both by himself and the navigator of the vessel independently, and a report in writing sent by the returning vessel. By the same means he was to send a transcript of all meteorological and other observations made during the voyage, and also a list of apparatus, stores known to be broken, missing, and needed, to be supplied next year. After the departure of the vessel the energies of the party were to be devoted to the erection of the houses required for stores, dwellings, and observatories. Lieutenant Ray had in his possession special instructions regarding the meteorological, magnetic, tidal, pendulum, and such other observations as were recommended by the International Hamburg Polar Congress. Careful attention was to be given to the collection of specimens of the animal, mineral, and vegetable kingdoms. These collections were to be made as complete as possible, and were to be considered the property of the Government of the United States and to be at its disposal. The collections in natural history and ethnology were made for and intended to be transferred to the National Museum.

As it was contemplated that the permanent station would be visited in 1882, 1883, and 1884 by a steam or sailing vessel, Lieutenant Ray was notified that the supplies for the station and such additions thereto as the present expedition deemed needful would be sent.

A special copy of all reports was to be made each day and sent home each year by the returning vessel.

The full narrative of the several branches given into his charge were to be prepared with accuracy, leaving the least possible amount of work afterwards to prepare them for publication. In case of any fatal accident or permanent disability happening to Lieutenant Ray, the command was to devolve on the officer next in seniority, who was to be governed by the same instructions. The remaining instructions were general in their nature, and appertained to meteorological, tidal,

and such other matters as appertain to the domain of meteorology, as well as observations in the domain of terrestrial magnetism.

The expedition was given a complete outfit of apparatus, and books of instructions to guide its observations.

The personnel of the expedition comprised, in addition to Lieut. P. H. Ray, commanding, Acting Asst. Surg. George S. Oldmixon, United States Army; E. P. Herendeen, interpreter; Sergt. James Cassidy, Signal Corps, United States Army, observer; Sergt. John Murdoch, Signal Corps, United States Army, observer; Sergt. Middleton Smith, United States Army, observer; Mr. A. C. Dark, astronomer; Vincent Randit, carpenter; Albert Wright, cook; Frank Peterson, laborer. With one exception the members of the expedition were strangers to Lieutenant Ray, and he subsequently had occasion to regret that more time and examination was not given in selecting the personnel, especially those intended for scientific work. Even with experienced observers it is deemed very difficult to do accurate work in so high a latitude as that in which this expedition subsequently found itself.

NARRATIVE.

Owing to adverse winds and calms, it was not until August 9 that we raised the high lands of the Aleutian Peninsula to the eastward of Ounimak Pass. A succession of calm days left us at the mercy of the currents, which here are strong to the eastward, and carried us in sight of Kadiak before a breeze sprung up that would enable us to bear up for the pass. We entered it on the afternoon of the 15th, when the wind fell, but the tide serving, we drifted through during the night. After entering Bering Sea we had stronger winds, and after clearing the pass we were enabled to stand on our course, which carried us about 60 miles to the eastward of the Pribilof Islands. On the morning of the 19th we sighted the island of St. Mathews, passing 3 miles to the eastward of it, its highest peaks only showing above the fog. We were favored with fair, strong winds from this time on until we arrived at Plover Bay, Siberia, where we anchored at 6 p. m. August 21. The weather being stormy, we were unable to get a sight of the sun until the 24th, when a series of excellent observations were obtained. This delay proved fortunate for us, for on the 22d the U. S. revenue steamer *Corwin* came into the harbor for coal. Her master, Captain Hooper, reported the ice very light in the lower latitudes of the Arctic Ocean, so much so that he had been enabled to reach Wrangell Land, a point never heretofore attained. To him we became indebted for a fine supply of reindeer clothing and tents, which he had collected in view of a possibility of his wintering in the Arctic. The supply came very opportunely, as we had been unable to obtain any deerskins at San Francisco and were depending upon sheepskins for our winter clothing. We found that our chronometers were running steadily and well, and, after laying in a supply of fresh water, were towed outside the harbor by the *Corwin* on the morning of the 25th. The wind dying away suddenly, left us at the mercy of the current, which was setting strong to the northward, and during the night we drifted through the straits, getting only a glimpse of the Diomede Islands and East Cape as we passed, as we were enveloped in a dense fog the most of the time. While at Plover Bay we obtained from the natives a quantity of most excellent trout, which proved an agreeable addition to our sea fare.

After passing the straits we encountered strong northeasterly winds, which retarded our progress very much. We sighted Cape Lisburne on the afternoon of August 31, and soon after it came on to blow so heavily that the vessel was hove to, and in that position rode out the gale. For over forty-eight hours we were unable to have fires on board for any purpose whatever. The force of the gale having abated on the 3d of September, we stood to the southeast, the weather remaining so thick that we were unable to obtain sight of the sun to determine our position. On the 7th we sighted Icy Cape, and then stood along shore to the northeast, keeping the land aboard until we sighted the point on the afternoon of September 8, and came to anchor about 1 mile to the northeast of Cape Smythe, thus successfully accomplishing the first and most important stage of our work. The voyage, though long and tedious, had been remarkably free from any accidents, and the meager comforts of our little schooner grew wonderfully luxurious when compared with the low desolate shore, which we could occasionally catch a glimpse of

through the drifting snow. Point Barrow, situated in latitude 71° 23′ north, longitude 156° 40′ west, the destination of the expedition, was first discovered by Mr. Elson, master in H. M. S. *Blossom*, commanded by Captain Beechey, in August, 1826, and is graphically described by him in his report of his memorable voyage, made to the Pacific and Arctic Sea, during the years 1825, 1826, 1827, and 1828. In the lapse of sixty years but few changes have taken place on this coast. The people of the generation that Captain Beechey met have all passed away, and the story of the coming of the first white man is one of the legends of the band of Nuwŭkmeun. The next visit made by white men was that of Captains Dease and Simpson, of the Hudson Bay service, who, in July, 1837, started from Fort Good Hope, and by boat passed down the Mackenzie to the sea, and along the northern shore as far as Return Reef, the point where Franklin was turned back by meeting with impassable ice, in 1826. They here found the ice fast on the land, and further progress by boats being impossible, Captain Simpson accomplished the remaining distance on foot, and thus succeeded in determining the coast line of the northern shore from Bering Straits to the mouth of the Mackenzie. H. M. S. *Plover*, Captain Maguire, wintered at Point Barrow the winters of 1852, 1853, and 1854, since which time the coast has been frequently visited by vessels of the American whaling fleet.

Upon arriving at the point we at once set about finding a suitable location for the observatory. At the extremity of the point is the village of Nuwŭk, which occupies all the land that is free from inundation by the sea. To locate the observatory among their huts would entail endless trouble and annoyance. Between the village and the mainland, 3 miles away, is a low, barren sand bank, from 40 to 100 yards wide, across which, during a westerly gale, the sea breaks when open. To the south and west of this the land gradually rises, until at Cape Smythe it is fully 30 feet above the sea, but here again we found the most suitable ground occupied by the village of Ŭglaamie, a cluster of about 23 winter huts. We were unable to go any distance back from the beach, as we had no means of transporting our stores by land, and the marsy condition of the country would have prevented us from going any distance back from the beach even if we had the facilities. A point about 12 feet above the sea level, lying between the sea and a small lagoon three-fourths of a mile northeast from Ŭglaamie, was finally selected. The soil was firm and as dry as any unoccupied place in that vicinity, and, as it was marked by mounds of an ancient village, would be free from inundation. The lateness of the season gave us but little time for deliberation. The young ice was already forming, and the migration of the birds about over. It was on the morning of the 9th of September that the work of debarkation was commenced in a driving storm of snow and a northeast gale.

The lumber for the house and observatories was rafted alongside the vessel and warped ashore. This work was difficult and arduous, owing to the heavy surf on the beach, and the ice being some distance off shore, the strong northeast wind blowing at the time got up considerable sea, the spray froze wherever it struck, so the lumber was coated with ice as soon as it was taken out of the water. There was too much surf to use our boats, and it was not until the 13th, when the wind fell, that we were able to commence putting the stores ashore. A temporary wharf was constructed, so the boats could be discharged without putting them on the beach. The natives, who at first appeared bewildered at the idea of our coming to stay, showed every disposition to be friendly now, and rendered us valuable assistance with their large skin boats (umiaks), and also in carrying stores up from the beach. After one or two attempts at petty thieving had been firmly and quietly checked, they showed no disposition to commit any depredations upon our property. Though it was snowing heavily, the work of landing stores was pushed with the utmost vigor, as the wind was very light from the southwest and the sea was quiet, and we could land the umiaks on the beach without the fear of staving them, so that on the morning of the 15th the party was moved on shore into tents. We landed the last of the cargo during that afternoon, and the *Golden Fleece* was cleared the following morning, and sailed at 12 o'clock. She was the last link that bound us to civilization, and we knew that nearly a year must roll around before we could hope to hear from the civilized world again, but I did not see a single despondent face among the little party as they turned from watching the gallant little vessel out of sight to their work.

At the same time the stores were being landed the foundation of the house was laid. This

was made safe and solid by excavating down to the frost, a distance of a little over 1 foot, and the sills and floor timbers firmly shored with blocks cut from pieces of driftwood. The bastion on the northwest corner was constructed from pieces of wreckage and driftwood, and was pierced for musketry below and for the Gatling gun above. As soon as the house was inclosed and roofed the stores were all moved in, except a supply for about six months, which was placed in a tent as a reserve in event of the loss of the main building by fire. The party moved in on the 22d, to put up the ceiling and partitions. We were obliged to bring the lumber in and pile it around the stove, so as to melt off the ice before we could work it.

Winter came on rapidly; the lagoon near the station was closed entirely on the 26th; the weather continued stormy and thick until the sea closed toward the last of November. The work of carrying the stores and coal from the beach up to the site of the station (a distance of about 100 yards) was very laborious, there being over 100 tons of it besides the lumber, and we never for one moment caught sight of the sun from the time we landed until the 28th of September, and then only for a few moments. As soon as the house was made habitable we turned our attention to getting the instruments into position. We commenced taking hourly observations in meteorology on October 15, and in magnetism on December 1.

The transit and magnetic instruments were temporarily mounted on wooden piers, which were constructed in the following manner: Timbers 16 inches square were cut to the proper length and placed on end in position in the observatories, the earth being removed so that the lower end rested on the perpetually frozen earth; they were cemented in their place by pouring water around them and allowing it to freeze. They remained firm and never altered their position in the slightest degree. The ice was found to be intact when the piers were taken down the following July, to be replaced by brick.

Every clear night the sky was illuminated by the most beautiful displays of aurora it has ever been my fortune to witness; they always commenced in the northeast and northwest, and seemed to spring from a dark low bank of clouds. The lights were never stationary for a single second, neither did they ever take the form of bows or arches so often seen in other latitudes, but great curtains of light flashing with all the prismatic colors seemed to be drawn across the heavens, ever rising and changing and often culminating in a corona at the zenith, falling like a shower of meteoric fire. As the winter advanced these displays were more brilliant, and were always of a character that defies description, either by pen or pencil, as they were never for two seconds alike. They were unaccompanied by any sound so far as we were able to observe, and the deadly stillness that always prevails in this region when the sea was closed, gave us an excellent opportunity to detect any sound, had there been any.

During the last days of September, when the ice on the fresh-water ponds and lakes was from 10 inches to 1 foot thick a sufficient quantity was cut, hauled to the house, and conveniently piled, for winter use.

In December, as soon as the drifted snow was sufficiently hard to cut into cakes, covered ways were constructed leading to the observatories, and the ice piled so that during severe weather no person was obliged to go into the open air to carry on the regular work of the station.

Life at the station now settled down into the dull monotony of the routine work; hourly observations in meteorology and the three elements of magnetism were carried on without interruption. To insure the health of the party each member was required to take exercise daily in the open air.

In January, 1882, work was commenced on a shaft for the purpose of getting the temperature of the earth. The formation for the whole distance was sand and gravel, mingled with a deposit of driftwood and marine shells, showing that each stratum represented the successive lines of ancient seashores. The earth was saturated with water. At a depth of 35 feet a deposit was found of clear water, unmixed with earth, too salt to be congealed at a temperature of + 12, which was the unvarying temperature of the earth at this depth. At a depth of 20 feet a tunnel was run to the east a distance of 10 feet, and at the end of it a room 10 by 12 was excavated out of the hard frozen ground. In this the temperature never rose above 22°. The walls were always dry

VIEW OF THE STATION FROM THE WEST, WITH THE CREW OF THE "NORTH STAR" IN CAMP.

and free from moisture, and the accumulation of hoar frost was very light. Here we stored whatever fresh meat, in the way of ducks, reindeer, walrus, or seal, that we were able to accumulate beyond our daily consumption. Our main supply was eider ducks, which, during the spring flight in May, were easily killed. We took 400 in 1882, and 500 in 1883; we found them excellent food, and when stored in the subterranean storehouse they were at once frozen solid, and would keep for any length of time.

Fresh meat is the great safeguard against scurvy in this region; I never saw a trace of it among the natives, and meat is their only food. The immunity of my party from all disease or sickness of any kind I deemed was owing to the fact that through our own exertions, and with some assistance from the natives, we were seldom without it.

In March, 1882, I made a trip into the interior, an account of which I submitted in my report of last year. Some narrow leads opened in the ice to the north and west of the point on the 20th of April, and the natives reported seeing whales passing to the northeast on the 23d of the same month, and they were seen passing in the same direction every day from that time until June 15; that seemed to terminate their northern migration, as we saw no more of them until August 15, when they were seen going to the southwest along the edge of the pack. It is at this season that most of the whales are taken, as it is impossible for the vessels to follow them into the ice during their northern migration.

In the spring of 1882 eider ducks were first seen on the 27th of April flying to the northeast, far out over the ice, and a few straggling flocks were seen from time to time until May 12, when they appeared in immense numbers flying low along the shore ice to the northeast. This migration continued until about June 1, and then almost entirely ceased.

About the time the first flights alongshore were seen, a number of male king eider were found on the land apparently exhausted from long flight and want of food. Some were caught and brought in alive, but they were generally dead when found, and always in an extremely emaciated condition. All species were represented in this flight, the king, Pacific, spectacled, and stellers. The Canada goose was never seen; but a few brent, white fronted, and snow or arctic geese came at this season and stopped with us through the hatching season, bringing forth their young on the mainland. The eider duck, with but few exceptions, continued their flight to the north and east. During July and August large numbers of the males were constantly flying to the westward over Perigniak, a point about 4 miles to the southwest of Point Barrow. The fact that they came from the breeding grounds was shown in the naked condition of the breast of some of those taken, the down having been plucked away to construct their nests. Those killed at this season were poor and unpalatable compared to those killed in the spring. But the natives take great numbers of them at this point at this season of the year, and one often sees half a dozen families here in camp for that express purpose.

By the last of June the tundra was nearly free from snow, and narrow leads of water were open along shore. The few hardy flowers indigenous to this high latitude were in bloom, and conspicuous among them were the buttercup and dandelion. There was also a small yellow poppy, named by the natives "tûkălûkăd jaksûn," which is also the name given by them to a small butterfly that appears at this season. The butterfly appears as the poppy fades, and they believe that the poppy is transformed, takes wings, and flies away.

On the afternoon of the 25th of June a vessel hove in sight to the southwest. She appeared to be in the solid pack, as there was no water in sight, but we soon discovered she was working her way along a narrow lead, about 6 miles from shore, which was not visible to us. At about 8 o'clock that night she was bearing about west true from the station, when she came to a halt; I at once dispatched interpreter Herendeen off to her. He returned the next day at 11 a. m., and reported that it was the steam whaler *North Star* (Captain Owen), on her first voyage from New Bedford. He brought a few letters and a file of New York papers, giving us news from the outer world. It was the first information we had of the death of President Garfield and loss of the *Rogers*. On the 27th I went out to her; found her fast in the ice, with no sign of open water in sight from her masthead. Captain Owen reported she had suffered a severe nip the night before,

and she was raised up bodily about four feet while I was on board of her. I visited her again on the 4th of July and she was still uninjured. During the night of the 6th the wind hauled around to the eastward, causing the pressure to slacken up, and several large cracks opened in the ice, one of them in close proximity to the ice-bound ship. Early on the morning of the 7th we saw she was afloat and working through the broken ice toward shore; when about 2½ miles from the station she again became fast and lay there all night. The following day (July 8) the pressure again slacked and a lead opened alongshore past where she was lying; she got under way and steamed slowly along the lead to the southwest. After proceeding a couple of miles she again became fast; the ice closing in from the west, she was now caught between the ground ice and the great pack which was setting bodily to the northeast. She remained immovable from about noon until 4 p. m., when our attention was suddenly attracted to her by a great outcry raised by her crew, and we could distinctly hear the cracking of her timbers as her sides were crushed in by the ice; her masts fell a few moments after, and her crew escaped to the ground ice. I at once set off to their assistance with what men could be spared from the station; we found they had saved nothing but their clothing, a cask of bread, and three boats; the few remaining fragments of the wreck were fast disappearing in the distance, being carried away by the moving pack. The crew all safely reached the land that night, being ferried across the open leads by the boats from the station; tents were pitched to shelter them, and every care given to their comfort. Captain Owen subsequently went out with his crew and brought in the bread, and boats to be used in moving to the southward along the shore lead, in the event that no other vessel should be able to reach the station. On July 14 other ships fortunately hove in sight, and the wrecked people were distributed through the fleet, between that time and August 2, the last going on board the bark *Thomas Pope*, bound for San Francisco. Different vessels of the fleet remained in sight of the station off and on until September 23, the steamer *Bowhead* being the last to visit the station. We sent by her our last mail to the United States.

On August 2 a small schooner was seen coming around the point to the north and east, which proved to be the relief vessel *Leo*, Lieutenant Powell in charge. She had been carried out of her course to the northeast by the current, in a thick fog; her master, being ignorant of the dangers attending navigation along this shore, having allowed her to drift into a position where, but for the providential springing up of a light breeze, she would certainly have been lost. By her we received three additional observers, Sergt. J. E. Maxfield and Privates Charles Ancor and John Guzman, of the Signal Corps, United States Army; a year's additional supply of provisions and coal; and the new magnetic instruments. With the help of the natives she was discharged on the 26th, and sailed the following day. I relieved and sent back by her Sergt. James Cassidy, Signal Corps, United States Army.

The new magnetic observatory was at once put up and the instruments mounted upon permanent brick piers, and observations with them commenced September 12.

Now that the ships were gone and all connection severed with the outside world, we had nothing to break the old routine of our duty at the station but the occasional visit of a native from some distant village. The faces of those living at Nuwuk and Uglaamie had become as familiar to us as those of our own people; they had ceased to be intrusive, but visited us almost daily with some curio or game for barter; and as the season advanced and water became scarce, we were daily besieged by the seal hunters coming in from the sea and begging for a drink of water, of which there is a great scarcity after the frost has sealed up all sources of supply. The scarcity of fuel, together with their inadequate means for melting ice and snow, causes them to suffer under a constant water famine from October to July, and they seemed to think that our supply was never failing.

During the fall of 1882 we experienced none of the heavy westerly gales so common in 1881, and the main pack, though always in sight, did not come close in, and the sea alongshore froze over comparatively smooth, save for the small floes that were always drifting to and fro with the current. This remained unbroken until January, when a heavy westerly gale drove in the old ice to the 3-fathom bar, which here lies parallel with the coast and about 1½ miles from it. Inside this bar the ice formed to a thickness of 5¾ feet, and a vessel might have wintered with

perfect safety at the anchorage off the station in 4 fathoms of water. Both the winters we were there, about 2½ miles to the southwest and 3 miles to the northeast, the old ice came in on the land with great force. In November and December the snow galleries were again constructed to the observatories, and the winter's work went on uninterruptedly. Observations of temperature in sea-water ice were carried on, and a series of tidal observations were made, extending through a period of one hundred and twelve days. These observations were taken on the open coast, and go to show that the open Arctic Sea is practically tideless, the mean rise and fall being only about two-tenths of a foot. (Report on tides.)

A peculiar disturbance was observed frequently during these observations. There would be a sudden rise and fall of from three to five hundredths of a foot, like a sudden wave. These occurred when the sea was entirely closed, with not a trace of open water in sight, and apparently in no way connected with the regular action of the tide. There would also be a variation in the height of the water of from 4 to 5 feet, often extending through a period of from seven to ten days, but in no manner affecting the normal rise and fall.

During the winter of 1882–83 temperature of the sea ice was taken in the following manner: The thermometer was secured in a wooden box, 6 by 6 by 15 inches, with a sliding door. This was placed in the ice 100 yards from the beach, where the sea was smoothly frozen over, 1 foot below the surface, and frozen in, so that the bulb was frozen solid in the ice.

The temperature of the sea water was taken top and bottom through the hole at the tide gauge in 3 fathoms of water. The results are given in the meteorological tables submitted with this report. I found that the second winter, with its long night, was much more trying upon the spirits and strength of the party than the first. The novelty had now worn off. There was no longer anything new or strange to interest them and there was no relief from the monotony of the routine of the regular work, and there is none so wearisome and wearing as this, without any change and without hope, for we had positive knowledge that there could be no change for us until our work was finished. So the slow time dragged on—days into weeks, months into years—so that exploration, or any work that required action would have been hailed with joy. After the return of the sun I made preparations for a trip into the interior, to locate geographically some of the discoveries made last year. I had by this time secured 1 excellent team of 8 native dogs, and the sled made at St. Michael, given me by Sergeant Nelson in 1881, still being strong and serviceable, I was well equipped for inland work.

Everything being ready, I left the station at 5.30 a. m., March 28, with Mr. A. C. Dark, assistant, a native guide, Apaidyao, and his wife. A team of 8 dogs and 1 sled was our only means of transportation, and on it we carried our instruments, arms and ammunition, camp equipage, twenty days' supply of coffee, sugar, hard bread, and pemmican, a small kerosene stove, and 1 gallon of oil. The sled was rigged with a small lug sail, which was a great help, with a fair wind. We traveled along the smooth shore ice to the southwest about 8 miles after leaving the station, when we came to where the pack had come in onto the land, and the ice on the sea was too rough and broken for our sled. We here took to the tundra and traveled parallel to the shore until we reached the mouth of a small stream about 10 yards wide, coming in from the southeast, called Sinaru, which has its source in a lake 7 miles inland. We here left the coast, our general course being south, crossing the lake at the head of Sinaru, which I found to be 7 miles across, and camped at 6 p. m. on a small stream flowing to the northeast; marched 37 miles. The country after leaving the coast was flat, and in the summer must be almost entirely covered with water, as we traveled the whole afternoon over a series of small lakes without seeing a single elevation of land that was over 5 feet above the surrounding country. Saw but few signs of reindeer and no natives, but saw where a hunting party had been in camp a few days before. Our dogs hauled their load with ease, though there was over 700 pounds weight on the sled. Weather clear, with light northeast wind.

March 29.—Snowing heavily this morning when we broke camp at 6 a. m. After traveling 4 miles we struck a stream about 30 yards wide, within a narrow valley, flowing to northeast. Natives gave it the name of Iuaru. The storm broke at 10 o'clock and the sun came out by 11. The country grew more rolling and broken, and at 12 m. we came in sight of Meade River, which

here flows through a valley about 1½ miles wide, with bold bluffs on either bank from 40 to 60 feet high. Obtained a meridian sight of the sun at noon for latitude and a fair sight for time during the afternoon. Traveled up the river on the ice 6 miles and then left it on our right. Crossed a neck of land 8 miles wide and struck it again at a point where a large stream called Usuuktu comes in from the eastward, with a channel about 40 yards wide and high, bold banks. Here we again traveled on the ice to a point 4 miles above the mouth of Usuuktu, and camped at 4.30 p. m. on the left bank of the river; marched 53 miles. I found an Uglaamie native here in camp. He was engaged in fishing and told us his nets were set just opposite to the camp. We obtained from him some fine whitefish; having no rifle, he had been unable to take any deer. I ascended the bluffs on the right bank, which were here 50 feet high. On them found the ruins of several winter huts built entirely of turf. The natives say that three generations ago all this region was inhabited by a people that lived by fishing and hunting reindeer, and did not come to the coast, but that the deer and fish grew scarce and there came a very cold season and the people nearly all died from cold and starvation. The few that survived went away to the Colville or joined the little bands on the coast, so that now this whole region is not inhabited and is never visited except by the hunters from Nuwuk and Uglaamie, who come here for deer during the months of February and March. Each year a few fish are also taken with gill nets in the deep holes along Meade River, the fish being here confined by the river freezing solid on the bars. All movement of water on this watershed is suspended during the winter, there being no rainfall or melting of snow from October to May, and springs are unknown.

March 29.—Broke camp at 6 a. m. Weather clear and moderate. Continued the march in a southerly direction along the river bed 4 miles, when we left it, climbing some high bluffs on the left bank to get on the level plain above and avoid the windings of the river. Traveled parallel with its general course all day, crossing it twice, and camped at 5 p. m. on a small tributary of Meade River, and about 6 miles from the main stream. Marched 25 miles. During the afternoon passed a high bluff which is a noted landmark among the natives and known as Nuasuknan. It is in latitude 70° 37′ north, longitude 157° 11′ west, and rises from 50 to 75 feet above the surrounding country and is visible for many miles around. Camped to-night with Mû′ñîalu, a native whom I had furnished with a rifle and ammunition to kill deer for the station. Found he had a fine supply on hand, and he very proudly showed us 10 as our share. Got excellent sights of the sun during the day for latitude and longitude. Saw several large bands of reindeer, and our guide succeeded in killing 2. Temperature last night + 16°; during the day rose to 29.2°.

March 31.—Weather cold and stormy, and as we are in a very comfortable snow house we concluded to lie over for the day. My guide has never been beyond this camp, and I can see he has no desire to add to his knowledge of the geography of this region, so I have made arrangements with Mû′ñîalu to go on with me. They were busy at work to-day preparing their sleds to haul in their venison to the settlement on the coast. Their manner of doing it I have never before seen noted. The sleds which they use for this purpose are made from drift wood fastened with whalebone and rawhide lashing. They are about 10 feet long, 2 feet wide, and the runners 8 inches wide and 1½ inches thick, straight on top and no rail. They are shod for ordinary use with strips of bone cut from the whale's jawbone, and sometimes with walrus ivory; but this would not do in hauling a heavy load over the snow where there is no beaten trail, so they are shod with ice in the following manner: From the ice on a pond that is free from fracture they cut the pieces the length of a sled runner, 8 inches thick and 10 inches wide; into these they cut a groove deep enough to receive the sled runner up to the beam. The sled is carefully fitted into the groove and secured by pouring in water, a little at a time, and allowing it to freeze. Great care is taken in this part of the operation, for should the workmen apply more than a few drops at a time, the slab of ice would be split and the work all to do over again. After the ice is firmly secured the sled is turned bottom up and the ice shoe is carefully rounded with a knife, and then smoothed by wetting the naked hand and passing it over the surface until it becomes perfectly glazed. The sled when ready for use will weigh over 300 pounds, and they load them with the carcasses of from 7 to 9 deer, weighing over 100 pounds each. Men, women, and children

harness themselves in with the dogs to haul these loads to the coast, often the distance of 100 miles and over, seldom making more than 8 or 10 miles each day.

April 1.—The weather being clear, we improved the opportunity to determine accurately our position. Observations were made for time, latitude, and declination.

April 2.—Broke camp at 8 a. m. with Mû'ñïalu for guide; traveled south 13 miles parallel with Meade River, which we struck at the confluence of a small stream coming in from the westward. For the last 6 miles the country had become much more rolling and broken, and at the point where we struck the river to-day the bluffs were over 100 feet high and showed successive layers of turf and sand, where the action of the river had cut them away during the freshets in the summer. I noticed one stratum of turf 5 feet thick 50 feet below the surface. There was not sufficient moisture in the sand between the strata of turf to cause it to solidify under the action of the frost. On the bars in the river we found a few fragments of fossil ivory; a fringe of scrub arctic willow skirted the bank of the stream, but no driftwood of any size was seen. Traveling now became quite difficult, as the river was too winding for us to follow its course by traveling on the ice, so we kept a southerly course, climbing the bluffs, where practicable, to cut off the bends. The dogs became tired out early in the afternoon, and we were finally obliged to go into camp on the ice under the lee of a high bluff on the right bank of the river. Marched 23 miles. Before dark I climbed to the summit of the bluff, which was 175 feet above the river, and could see a low range of mountains, running nearly east and west, about 50 miles away. From the break of the country, I have no doubt Meade River has its source in that range, so I named them Meade River Mountains. The native guide notified me upon my return to camp that he did not wish to go farther south; that he was unacquainted with the country, never having been so far in the interior before. Beyond this he peopled the country with imaginary enemies. Nothing I could offer would induce him to go farther. As I could not well get along without their help in dragging the sled up the hills, I was obliged to make this my turning point, much against my will. We saw no signs of deer, wolves, or any game after we struck the foothills; the range of the reindeer seems to be the flat country we had crossed to the north.

April 3.—Broke camp at 8 a. m. and returned to Mû'ñïalu's camp, reaching there at 4 p. m. Weather clear. The sun on the snow fields affected our eyes very seriously in spite of the shaded glasses we wore, and the natives were affected equally as bad as ourselves.

April 4.—Lay over in camp, having our boots dried and repaired and getting ready for the return journey. Weather clear and cold.

April 5.—Broke camp at 5.30 a. m. Traveled on our outward trail to camp No. 2 and slept in the hut we used on our way out. Weather clear and cold, with very little wind.

April 6.—Broke camp at 6 a. m. Followed old trail back to camp No. 1. Weather bright and clear; suffered intensely all day from my eyes, becoming so inflamed I could scarcely see. Mr. Dark does not seem to be so seriously affected. Temperature fell last night to —13°.4; during the day, —24°.

April 7.—Broke camp at 5.30 a. m. and reached the station at 5 p. m. Was obliged to travel with my eyes bandaged; Apaidyao was also nearly blind. No person can be exempt from this terrible suffering who travels in this region at this season of the year; the blinding glare of the sun upon the snow affects the strongest eyes, and we found no preventive. We had several varieties of shaded glasses and goggles, but found as much protection in the wooden shades made and worn by the natives as we did in our own improved glasses, and they were much more comfortable, as the moisture from the face did not congeal upon them so readily as upon the wire gauze and frames of the goggles. Other than this, there are but few hardships attending travel to a small party properly equipped in this region at this season of the year, and the nearer one conforms to the habits of the natives the less liable he is to meet with disaster, and the less he will be burdened with unnecessary camp equipage and blankets.

The snow hut (iglu) of these people is very quickly and easily constructed, and ordinarily does not consume more time than is required to pitch a wall tent, and is constructed in the

following manner: A place where the snow is about 4 feet deep is selected for camp and a space 5 by 9 feet is laid off; the upper surface is cut into blocks 2 feet square and 8 inches thick and set on edge around the excavation for side walls; at one end 3 feet of the space is dug down to the ground or ice; in the balance about 18 inches of snow is left for a couch; sides and ends are built up tight and the whole is roofed with broad slabs of snow 6 feet thick, cut in proper dimensions to form a flat gable roof, loose snow thrown over all to chink it, and at the end, which is dug down to the ground, a hole is now cut just large enough to admit a man crawling on his hands and knees. The hut is now finished, sleeping bags, provisions, and lamp are passed inside, dogs are fed and turned loose after everything they would be liable to eat or destroy is secured by caching them in the dry snow. Arms, instruments, and ammunition should never be taken into the hut; it is always best to leave them on the sled in the open air. After all outside work is done everybody goes into the hut and the hole is stopped from the inside with a plug of snow which has been carefully fitted, and no one is expected to go out until it is time to break camp the next morning. The combined heat from the bodies of the inmates, together with the lamp, soon raises the temperature up to the freezing point, and a degree of comfort is obtained that is not attainable in any other manner of camping in this region. The more permanent snow huts of the deer hunters, which they often occupy for a month or more, are much more elaborate. They are usually built where the snow is 6 or 8 feet deep, so the room is high, and is approached by a covered way and an anteroom, in which the heavy outside clothing is stored, and when fuel is obtainable a kitchen is added to the structure, with a fireplace cut out of the solid walls of snow, with jambs and chimneys of the same perishable material. I saw fireplaces in use that had had a fire in them for at least one hour each day for a month or more and were still intact; the parts that were exposed had softened a little under the effects of the first fire and at once hardened into ice, and remained unchanged so long as the temperature in the open air remained below zero.

By the latter part of April or the first part of May snow houses are no longer tenable and natives take to their tents (túpĕks). Their winter huts at this time are also vacated, as they become too damp for comfort. After the snow began to soften so it was no longer practicable to build a snow hut I camped very comfortably by digging a hole in the snow 6 by 8 feet, building up side walls 3 to 4 feet high, and stretching over it a deerskin blanket or the sled sail, using the sled mast for a ridgepole and our snowshoes for rafters. The natives in their excursions usually carry a small stone lamp and a supply of seal blubber for illuminating purposes. They use no blankets or sleeping bags when traveling, but carry a deerskin or a piece of walrus hide to lay on the snow underneath them. On this they huddle together without any covering other than the clothing they travel in. At such times their food (meat or fish) is eaten raw, except where they have provided themselves with a kind of pemmican, which is made by mixing chewed deer meat with deer tallow and seal oil. This food is not agreeable to the taste, probably owing to the fact that the masticators are inveterate tobacco chewers.

The sled we used on all our journeys was made by a native at St. Michael, and presented to the expedition by Sergeant Nelson when at Plover Bay; it was 12 feet long and 20 inches between the runners; had side rails, with a steering handle at the rear end, and was fastened throughout with rawhide lashings; the runners were shod with steel, and it was far superior to any sled I ever saw on the northern coast; it was still in excellent condition after two years' service; its carrying capacity was about 800 pounds, and I think it was the best pattern of a sled I ever saw for Arctic work; it was light (weighing only about 50 pounds), strong, and durable, and could always be repaired with the material at hand among the natives, should it at any time become damaged.

Early in May the hunters began to come in, and altogether I succeeded in getting from them eighteen deer, which, together with 500 eider ducks killed by the party during the spring flight, gave us a large reserve supply of fresh meat, which was carefully stored in the cellar. Sergeants Murdoch and Smith were indefatigable in their work, completing the collection so far as practicable in natural history, and many valuable specimens were obtained. Cracks opened in the ice to the north and west of the point, and whales were reported seen by the natives April 12; the

leads were narrow, often closing entirely, with no water in sight for days, and the natives reported hearing or seeing whales nearly every day up to June 12.

The spring was very backward and we experienced a great deal of cold, disagreeable weather; the shore leads opened slowly. In Elson Bay and along shore to the eastward of Point Barrow the ice held on until late in August, and this prevented my getting along shore to the eastward with the whaleboat before the arrival of the relief vessel, as I had intended. It was my desire to explore the coast as far as the boundary at least, and had the season been as favorable as that of 1882 I could have left the station by June 12.

On June 9 the natives succeeded in killing a large whale, the first they had taken since we had been on the coast, and was the cause of considerable excitement among them for several days; they came in from all points to join the general feast on the carcass, which was free to all who cared to come and partake.

By the 1st of August we were becoming extremely anxious about a vessel reaching us this season, as the ground ice was still intact from Point Barrow to the Sea Horse Islands, and it was impracticable to work a small boat along shore. The whaleboat was fitted and provisioned for a voyage and held in readiness for a move as soon as the ice would let us out; outside the bar there was one narrow open lead extending as far as the eye could reach to the southwest, but there was no break in the ground ice to let us into it; besides, it closed under a westerly wind or when the prevailing northeast wind slacked up. On the morning of August 1 a thick fog hung over the ocean, and when it lifted, about 7 o'clock, our eyes were gladdened by the sight of three steamers 6 miles away, working slowly up the lead from the southwest. With Captain Herendeen I at once crossed the ground ice and went on board the nearest ship, reaching her about 11 a. m. Found it to be the *Orca*, Captain Colson, from San Francisco, a new vessel on her first voyage. From her we received our first mail, and from private letters learned that the station was to be abandoned as soon as a vessel could reach us. Captain Colson reported the balance of the whaling fleet lying at anchor along the coast between Point Hope and Cape Belcher; not being so well fitted as the new vessels, they would not venture into the pack. The *Orca* tied up to the ground floe off the station until along in the afternoon, when, in company with the *Bowhead*, *Balæna* and *Narwhal* (all steamers that had now come up), she proceeded on up to the Point; the lead here was closed and the pack was solid to the north and east, and fast on the land to the eastward of Point Barrow; they tied up under the lee of a large floe berg that had grounded in 4 fathoms of water.

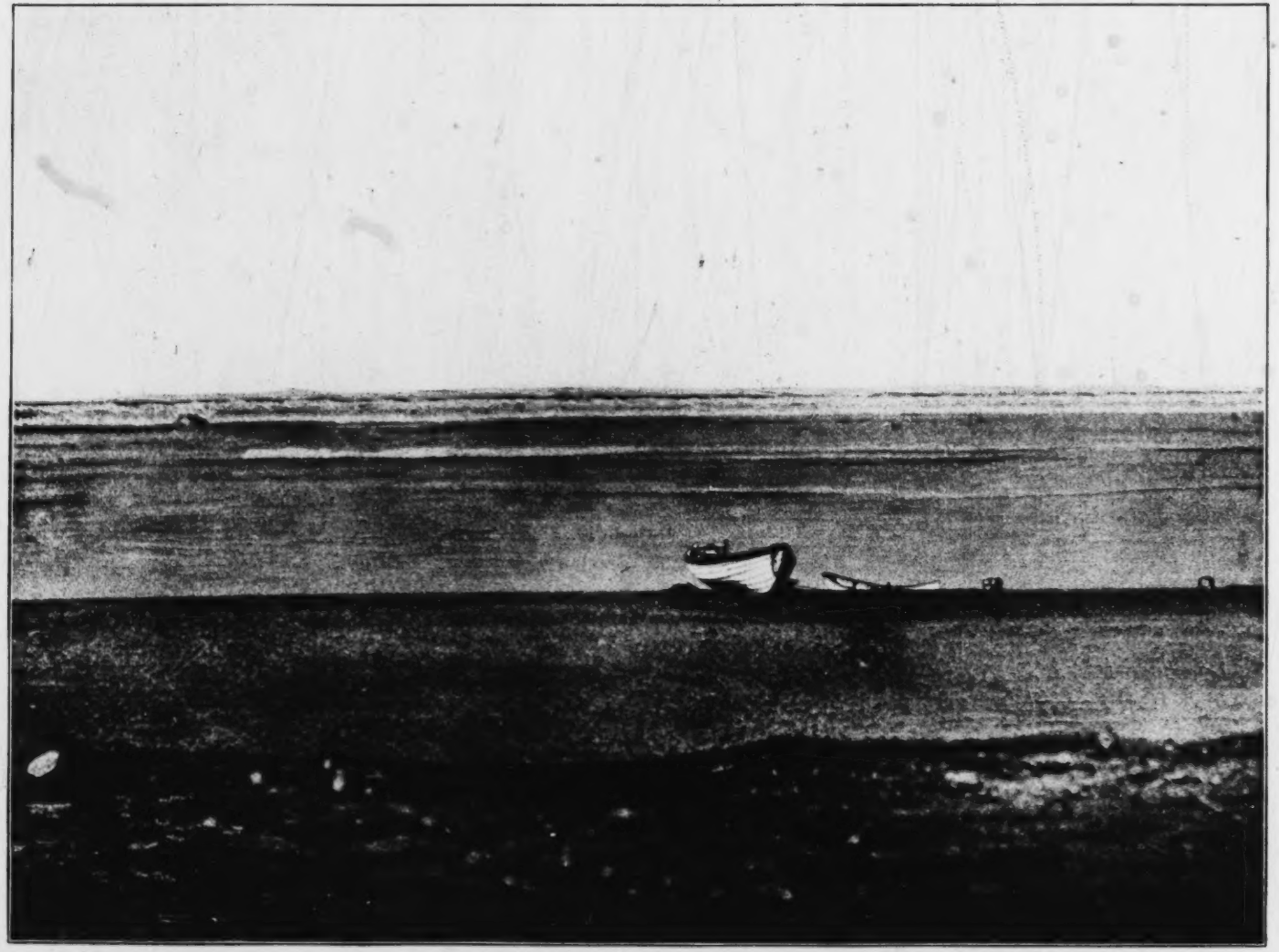
The following day the steamers *Belvidere*, *Lucretia*, and *Mary* and *Helen*, came up bringing considerable mail, but no orders, except one from the Chief Signal Officer directing me to dispose of such stores as could be sold to advantage. I sold what I could to the fleet, packed everything not required for immediate use, and as far as possible, without discontinuing the work of observation, made everything ready to embark, so that when the vessel sent to our relief should arrive she would be delayed as short a time as possible.

By August 15 several sailing vessels had worked up to the station, and all were at anchor behind the ground ice which had now broken away in several places; there was also an open lead along shore. On the 16th the bark *Sea Breeze* (Captain McDonald) anchored off the station and reported that he had spoken the schooner *Leo* at anchor off Point Belcher, 80 or 90 miles to the southwest, with orders for the station. He also reported the ice close in off Sea Horse Islands, and that he thought the master of the *Leo* did not care to venture into the ice, as he had been lying there over a week. I at once prepared to go to her in the whaleboat by working along shore, but a heavy gale springing up from the northeast on the 17th prevented our sailing. In the meantime Capt. L. C. Owen, of the bark *Rainbow* (who was master of the *North Star* when she was wrecked in 1882), came to the station and tendered me the services of his steam whaleboat for the trip, which was very gratefully accepted. He sent it down to me on the 19th, with Mr. Rogers, his first mate, in charge, and a crew of three men. I left the station at 6.40 p. m. the same day, with Sergeant Murdoch and Interpreter Herendeen. The weather was clear and warm, with little or no wind when we started, so we steamed along shore about one-fourth mile from it,

keeping inside the ground ice. At 8 p. m. a strong breeze came out from the northeast, when all sail was set, and we made great speed, so that by midnight we were off Sea Horse Islands; by this time there was a heavy sea running, and the wind had increased to a gale, and we were running before it under close-reefed mainsail and all steam, to avoid being pooped and swamped, as the sea was breaking heavily on the shoals off Point Franklin. The heavy pack was aground on the outer bar, but there was room for a vessel to pass between it and the shoals.

After rounding Point Franklin we headed for Point Belcher, and at 2 a. m. sighted several vessels at anchor off the point, apparently making very bad weather of it, as there was no shelter here from the wind and sea. As we neared them we were able in the dim twilight to make out the *Leo* by her peculiar rig, she being a topsail schooner, and we bore up to her and succeeded in getting a line on board as we swept past, and with considerable difficulty were taken on board. The gale increased in fury, and before we could hoist in the launch the *Leo* dragged her anchor and drifted rapidly to the leeward. The captain ordered the cable to be slipped, and the vessel got under way, and I requested him to keep her on a northwest course until he came up with the ice. While the vessel was being got under way, Mr. Rogers, who saw his launch was in danger of being swamped, sprang into her with his crew, cut the painter, and they disappeared from our sight in the storm. We were extremely anxious for his safety, and we had seen that all of the whalers had been obliged to put to sea at the same time we did, and that it would be impossible for him to land north of Wainrights Inlet without losing the boat, and it was doubtful if he could keep her afloat until he reached that point. At 4 a. m. we came up with the main pack, and the vessel was hove to under the lee of a large field of ice that seemed to be nearly stationary. Here she safely rode out the gale, which abated during the night, so that on the morning of the 21st we were able to stand in toward the land, which we sighted at 7 a. m., and stood in in search of the launch and the anchor which had been slipped and buoyed the day before. At 10 a. m. the captain recovered his anchor, and we stood to the southwest along shore in search of the launch but were unable to find any trace of her that day.

The next morning, when off Wainrights Inlet, we spoke the bark *Helen Mar*, and found she had the boat and party safe on board, having picked them up that morning. We then learned that Mr. Rogers had succeeded in making Wainrights Inlet after he went adrift from the *Leo*, and had ridden out the gale at anchor there, and, sighting the *Helen Mar* before he did the *Leo*, had gone on board of her. The wind being southwest, strong and favorable, I directed Captain Jacobson to put the *Leo* on her course for Uglaamie, which he did, and we came to anchorage off the station at 7 p. m., on the 22d, passing through and past considerable pack on our way. I at once landed Mr. Marr, an assistant of the United States Coast and Geodetic Survey who had been sent up to make a series of pendulum observations, with a part of his instruments; gave them all the assistance I could. At the same time I pushed the preparations for embarking, as the ice was liable to close in at any moment. We suspended work at 10 p. m. It came on to blow heavily from the southwest during the night, sending the pack in. The *Leo* slipped her cable, and escaped around the point to avoid being crushed or forced ashore. We could see her spars above the ice to the eastward of the Point when we got out in the morning. Private Clarke, of the Signal Corps, and Mr. Schindler (Mr. Marr's assistant), who remained on the *Leo*, came down to the station overland during the day, and reported the *Leo* uninjured. During the night of the 23d the wind came out from the northeast and blew heavily, setting the ice about 1½ miles off the western shore, allowing the *Leo* to work around to the westward of the Point during the following day, where she came to anchor at 10 p. m., the wind being too light for her to stem the strong northeast current that was setting along the shore. The wind hauled to the southeast and freshened during the night of the 24th, so that she was enabled to get under way and reach the station, anchoring there at 7 a. m. I at once caused the balance of Mr. Marr's instruments and material to be landed, but was unable to embark any stores, as Captain Jacobson, in his efforts to recover his cable and anchor which he had slipped on the 23d, had gotten so far offshore that we were unable to run a line to the vessel for the purpose of warping our boats to and fro. This was necessary, as I had not sufficient men to fully man the boats and handle the stores, and the natives' boats could not be with safety used in the sharp ice that was running with the current



ARCTIC OCEAN FROM THE STATION, AUGUST, 1883.

and piled high on the beach. We worked all day trying to kedge the schooner in, but the wind blowing a gale offshore rendered all our efforts futile. I placed Interpreter Herendeen on board that night, so that Captain Jacobson could have the benefit of his experience and advice should she again be driven away from her anchorage, as Captain Jacobson was totally inexperienced in Arctic navigation.

Just before dark five whaling barks came around the Point and anchored 1½ miles above the station. We all spent an anxious night, for the wind increased to a gale and hauled to the southwest and we could hear in the darkness the grinding of the pack as it came in, and were not surprised in getting up the next morning to find that the *Leo* was gone again, and that the sea was closed as far as the eye could reach. The *Leo* had escaped again around the Point, but three of the whaling barks had not been so fortunate; they were all fast in the pack, the crews were passing and repassing from the ship to the land over the ice. Two of the vessels had gotten foul of each other, and one, the *Abraham Barker*, had lost her rudder. With a glass from the lookout we could make out the *Leo* to the eastward of the Point, looking like a speck among the great ice fields. During the day the gale abated, the pressure slackened up, and toward night several small leads were visible. The wind came out from the southeast during the night, and early the next morning the *Leo* was seen to be under way slowly working her way back to the station through a narrow shore lead that opened during the night; she came to anchor off the station 200 yards from the beach. Upon going on board I found her considerably damaged; she had been nipped, her stem partly knocked off, her rudder post split, and she was leaking badly.

In view of these facts, and orders having been received for the return of the party to the United States, I determined to abandon the station at once. During the past two days I had caused all the subsistence and quartermaster stores worth saving to be carried down from the house to the beach; a whale line was run from the shore to the vessel, so one man could haul the boats two and fro, and the embarking was commenced at once, the first boat load going on board at 8 a. m. Mr. Marr discontinued work on the pendulum, and took down the parts he had placed; the work went on rapidly with the two whaleboats belonging to the station. It was still impossible to use the native boats with safety, as there were great masses of loose pack ice running with the current, and the beach was piled high with broken ice; at 2 a. m. the instruments were taken down and packed, and observations on shore ceased; the last boat load was sent off at 10 p. m., and at 12 midnight the party went on board, leaving one man on shore to see that the natives did not carry off anything that might have been accidentally left.

The ice was too heavy and compact the next morning to enable us to get under way, so the captain improved the time in grappling for the anchor and cable he had slipped the night of the 25th. He succeeded in recovering it, which was extremely fortunate, for it was his best, the remaining one being very light. I took a party on shore and brought off the few remaining articles of any value that I did not intend to give to the natives. I left them the house and furniture intact with the stoves, and about 12 tons of coal, a grindstone, some old canvas, and a few worn-out tools, were about all that was left; but these were of great value to the natives, and after giving them a feast of hard bread and molasses we bade them good-bye, amid many expressions of regret at our departure. I placed the buildings in charge of some of the most influential men, who promised they would not allow them to be torn to pieces, but be kept as a place of refuge for any shipwrecked people who may chance to be cast ashore on this barren coast. A whaleboat passed up during the day with Captain McKenna, of the bark *Cyanne*. He reported that his vessel was driven ashore off Point Belcher, in the gale of the 25th, and would prove a total loss. He came up to get assistance from the vessels at the Point in saving her valuable cargo of whalebone.

On the morning of the 29th, the lead to the southwest being open and the wind being favorable, the captain took his anchor and got under way at 6 a. m., and we commenced our homeward voyage. The familiar shore and village and the house that had been so good and comfortable a home to us for two long years soon faded in the distance. After sailing 2 miles we got clear off the loose ice that was running with the current and into clear water, with the old pack close in to the northwest, arriving off Point Franklin at 9.30 p. m., when the wind fell and we came

to anchor in company with eleven ships of the whaling fleet that had worked out and had come down the same time we did. The wind came out from the westward during the night, and the captain got under way; stood off and came up with the pack about 6 miles from the land, when he tacked and stood in toward land; but again the current was setting so strong to the northeast that we could not make any headway on our course, and we were very glad to get back to our anchorage under the lee of Point Franklin, where we lay until the next day, when we again got under way with a light southeast breeze, which let go after we had gotten around the Point, and we were again obliged to anchor at 10 a. m., to prevent being carried off to the northeast by the strong current setting along shore here.

Sailing vessels navigating this sea should never allow themselves to get off soundings north of Point Belcher, except in a strong steady wind, nor allow the vessel to drift during thick calm weather, if it is possible to get an anchor down. The needle is useless here; the land or lead line is the only safe guide, for should a sailing vessel be carried off soundings off Point Barrow with light winds or calm, she runs great danger of being lost; this has been the fate of nearly all vessels so caught, especially late in the season.

At 4 p. m., the breeze freshening, we got under way again and stood on our course along the coast and about four miles from it. We experienced light baffling winds, making but little headway from that time until the afternoon of September 2, when the wind came out strong and steady from the northeast. We sighted and passed Cape Lisburne that day and sighted the Diomede Islands at noon on the 3d. During the day the wind increased to a gale and the weather grew thick and cold, with considerable snow; sail was shortened, and at 3 p. m. we passed Cape Prince of Wales, running at great speed before the wind; after passing through the straits the vessel was headed for Norton Sound, it being necessary that I should go to St. Michael to land Private E. Clarke, of the Signal Corps, who had been sent out to relieve Sergeant Leavitt, an observer on that station. As soon as we hauled under the high land to the south and east of Cape Prince of Wales we ran out of the wind, and our progress was slow.

On the 4th of September the fog lifted and we sighted King Island and Cape York, and on the 6th passed close to the southward of Sledge Island, but owing to a head wind, did not sight the high land near St. Michael until the 8th. We stood in toward it and came to anchor off the fort at noon on that day, where we were received by a salute fired from a couple of old ship guns. Soon after a boat came off to us bringing, very much to our surprise, Lieut. Frederick Schwatka, Third Cavalry, who reported that he had made the passage of the Yukon on a raft, exploring its course from its source to its mouth, making one of the most remarkable raft voyages on record. He had been at St. Michael since the last of August, and was extremely anxious to get away with his party. Though we were very much crowded on the *Leo*, I did not think it would be right to refuse him passage, as there would be no opportunity for him to return to the United States before another year, this station being visited only by vessels of the Alaska Commercial Company, and there would be none due before the following June. So I directed him to hold his party in readiness to come on board as soon as we were ready to sail. We were short of fresh water and had to lay in a supply before again putting to sea. For the first two days we were in port it blew a gale from the southeast, so it was impossible to get any water off to the ship. On the afternoon of the 10th the captain reported he had succeeded in getting enough on board to last us until we could reach Unalaska or Plover Bay, whichever place I should conclude to go to, so at daylight on the 11th Lieutenant Schwatka and his party were taken on board and we put to sea at 10 a. m. Found it was blowing a gale from the northwest when we got outside, and after making a few tacks under close-reefed sails, found we were making no headway, so we were glad to run back into the harbor, where we came to anchor at 3 p. m.

The following morning, the wind having hauled more to the north, we again put to sea, and the next morning sighted Cape Darby, a high headland on the northern shore of Norton Sound. We were obliged to make this northing to avoid a dangerous shoal that makes out from the mouth of the Yukon; in running out of Norton Sound it is not safe to run west, south of 64 lat. During the afternoon of the 13th the wind settled in the northwest and blew hard and steadily

FLOEBERG ON THE BEACH, AUGUST, 1883.

all that night, and we found it would be slow work beating up to Plover Bay. The ship was leaking so badly that the pumps were kept going one-third of the time and the slightest accident to them would soon send her to the bottom; and as I knew that the meridian of Unalaska had been as well if not better determined than that of Plover Bay, I decided not to go to the latter place, but to proceed direct to Unalaska and there make an effort to repair the vessel, as I was told that there was sufficient tide at that place to enable us to get at her bottom by discharging her cargo and placing her on the beach at high tide and working on her during low water; so as soon as we were clear of the Yukon flats she was put on her course for that place. The wind increased to a heavy gale from the northwest on the 15th, and we made excellent time, as we were running nearly before it. During the night of the 16th, the vessel was hove to to wait for daylight, as we knew we were near land, and on the morning of the 17th we sighted the island of Unalaska to the south and about 20 miles away; the wind had fallen so light during the night we were able to make but little headway and did not get into the harbor and at anchor until 10 o'clock that night.

We found the United States steamer *Corwin* and the Alaska Commercial Company's steamer *Dora* at anchor here, the former on her return from Kotzebue Sound and the latter on her annual voyage to the Aleutian Island stations. The wind not being favorable to sail into the inner harbor, which was the only place where the vessel could be safely beached, I made application to Captain Healy, commanding the *Corwin*, for the assistance of the cutter to tow the *Leo* in. He very readily complied with the request, and at once got up steam, and at 11 a. m. placed the *Leo* at the company's wharf, where the bulk of her cargo was discharged. Owing to a severe wind storm prevailing at this time we were unable to haul her up until the afternoon of the 20th, when she was beached at high tide. We improved the time in getting observations of the sun, and determining the declination of the needle. We were unable to get at the leak on the first ebb, but on the 21st the water fell sufficiently low to enable the workmen to repair the damage, which was found to be about 4 feet below her water line, where a butt had been started, and the water was so clear that we could see that she had sustained no damage below that point, and we were pleased to find upon floating her off on the next high tide that the leak was entirely stopped.

Such stores as had not been disposed of were reembarked on the 22d and the vessel warped out to her anchorage ready for sailing. The 23d was too stormy to admit of our going to sea, but the wind having abated slightly toward night, I directed the captain to get under way on the morning of the 24th, which was done at 8 a. m., being towed outside the heads by the *Corwin*, whose services had again been kindly placed at our disposal by Captain Healy. We found the wind blowing strong from the northwest when we got outside, and a very heavy sea running; we parted company with the *Corwin* as soon as we passed the capes by the breaking of our towline, and the *Leo* was at once headed for the pass of Akoutan, through which we passed out into the Pacific at 12 m. From this time the wind continued fair during the whole of the voyage across the North Pacific. We followed nearly in the track of the great circle route, and made such remarkably good time that the Farallones were sighted at 3 p. m.

On October 6 the wind fell as we ran in toward land, and we drifted through the Golden Gate in a dead calm that night at 12 o'clock, coming to anchor off the Presidio at 2 a. m. October 7, and reporting to the Chief Signal Officer by telegraph the same day.

The object for which the expedition was organized being accomplished, it was formally disbanded October 15; its work having extended through a period of over twenty-seven months, during which time the expedition had sailed over 7,500 miles, had established and maintained itself at the northern extremity of this continent in latitude 71° 16′ north, and successfully carried out the instructions received from the Chief Signal Officer, and brought back the record of an unbroken series of hourly observations in meteorology, magnetism, tides, and earth temperatures, besides a large collection in natural history and ethnology, and penetrated into the interior to a point never before visited by civilized man.

During the whole period all the members of the expedition enjoyed excellent health, not having a single man on the sick report for two years.

To the individual members of the expedition who returned with it to the United States great credit is due for their obedience to orders, faithfulness, and intelligence in performance of their duties, and for their patient endurance of the many trials they were called upon to suffer; for the work of scientific observations in these high latitudes is one of patient endurance on the part of the observer, confined, as he is, within narrow limits, without the excitement incident to travel. The unvarying monotony of the work is necessarily very wearing, but during the whole time no murmur or complaint was ever heard.

REPORT OF A SUPPLEMENTARY EXPEDITION INTO THE COPPER RIVER VALLEY, ALASKA, 1884,

BY

Lieut. W. R. ABERCROMBIE, Second Infantry, U. S. A.

SUPPLEMENTARY EXPEDITION INTO THE COPPER RIVER VALLEY, ALASKA.

By Lieut. W. R. ABERCROMBIE, Second Infantry, U. S. A.

On May 21, 1884, I was ordered to command a supplementary expedition into Alaska to that of Lieut. Frederick Schwatka of the year previous. The officers detailed to accompany me were S. Q. Robinson, captain and assistant surgeon, U. S. A.; V. J. Brumback, second lieutenant, Second Infantry, A. Q. M., A. C. S., and Charles A. Homan, who acted in the capacity of topographer.

At the date above named little was known of the interior of Alaska. The conflicting interests between the white people and the Indians of the Territory were likely in the near future to result in serious disturbance, hence it was deemed important that all possible information as to the facts should be obtained for the guidance of the military branch of the Government. I was instructed to make my objective point the district of country drained by the Copper and Tanana rivers, and ascertain as far as practicable the numbers, character, and disposition of all Indians living in that section of country. I was to learn the manner into which the natives were subdivided into tribes and clans, the district of country they inhabited, their relations to each other, and especially their disposition toward the Russian Government in the past, as well as the feeling which existed among them toward the present Government, and the white people who were making their way toward that region. I was farther instructed to examine their modes of life and means of communication from one part of the country to the other, the amount and kinds of material of war in their possession, and from whence obtained. I was expected also to inform myself as to the character of the country and the means of sustaining a military force, should one be needed in the Territory.

My further instructions were to examine the kind and extent of the native grasses, and ascertain if animals ordinarily used in military operations could be subsisted and made of service there; to observe the character of the climate; to gather information that would be valuable to the military service; to impress the natives with the friendly disposition of the Government; to avoid provoking the hostility of the natives, and to make a full report as far as possible of my journey, and bring back maps, tracings and field notes relating to the country over which I traveled.

On June 1 I took passage on the steamer Idaho, and on June 12 arrived at Chilkat. Two days later I reached Sitka, at that time the terminus of the line of steamers by which I was conveyed.

Nuchek was reached June 16. Here stores were landed, consisting of rations for 15 men for ten months; clothing for 15 scouts for one year; Sibley tents; 2 paulins, coverings for rations; shovels, axes, etc. Arrangements were made with natives to furnish 3 bidarras, used for river navigation, and for the hire of 27 natives to paddle and steer the same. In a consultation held with Captain Baldwin it was decided that we would return to Nuchek on June 1, 1885.

I met with considerable trouble in securing a sufficient number of bidarras as had been previously agreed upon on the part of the natives, and was subsequently compelled to put up with

1 bidarra and a clumsy old Russian ship's boat without oars. Transportation being thus cut down to 1 boat and 1 bidarra, it was found impossible to transport the tentage, which was left in charge of an agent of the Alaska Commercial Company. After numerous annoyances we finally put to sea. After an hour or more of hard work a point of Hitchenbrook Island was rounded. This is a small peninsula, on which is located Nuchek or Port Etches. The gulf of Chugash (or as it is more commonly known, Prince William Sound), lay before us, its edges fringed with snow-capped mountains, with bright, glittering glaciers coming down to the sea that constantly played at their base.

After four hours' steady rowing with green hemlock oars a light breeze sprang up in our favor, when we improvised a sail which drove us along at the rate of about 5 miles an hour and lasted about six hours. Then the breeze died out, leaving the mighty Sound glassy and smooth save for the gently heaving ocean swell. And as the sun dipped toward the snow-capped peaks it shed a most beautiful pink glow over them, that even the most stolid and unobservant could not help but notice and feel the grandeur of his surroundings. We now put out our clumsy oars, and after two hours' rowing we made camp at 11.30 p. m., when down came the mosquitoes in clouds. Being thoroughly fatigued with our 40 miles journey, we soon fell asleep. Although it was daylight I might say all night, the sun disappeared about two hours only. The coast here, as elsewhere in the Territory, is almost iron bound, and a landing can be effected at comparatively few places. The first 20 or 30 miles of the route was covered with a dense, impenetrable growth of alder and nettle interspersed with berries. The latter comprised the salmon, black currant, and cranberry. Game is confined to the aquatic birds, grouse, bear, and goats. Fish were found in the greatest abundance. The varieties found on the part of the coast traveled from Nuchek to Copper River are: Cod, halibut, herring, and about seven different varieties of salmon. In addition there are mussels, crabs, and sea-urchins. Food sufficient to sustain life can at all times be found. It does not equal the soldier's rations, and the white man's strength soon fails him if worked hard on this diet alone.

June 21 I broke camp No. 2 at 5 a. m. and about 2 miles from camp struck a strong head wind. But the tide was with us and we passed through a narrow strait between Hinchenbrook and Hawkins Island. This is the southwest passage or strait connecting Prince William Sound and the ocean, but one that can be used by small boats only. The water within a radius of 30 miles of the mouth of Copper River is very dangerous for navigation. The glacial deposits from this river have formed innumerable bars and mud banks, visible only at extreme low water when the surf breaks over them. About 3.30 p. m., when about 5 miles from shore and about 8 from the northwestern mouth of Copper River, our oars suddenly came in contact with the bottom. In another 10 feet our boat ran hard aground on a mud flat. Fortunately there was little or no sea running or our boat, including its crew, would have been a total loss. The tide turning in about three hours at 6 p. m., we got our boat off and ran in with the tide to what we supposed was the main mouth of Copper River. It afterwards turned out, however, to be one of the northwest mouths and not the largest. To the left going in we had noticed a large glacier reaching to the shore. It was about 10 miles broad at its base and extending into the mountains some 20 miles. This was called "Sheridan Glacier," in honor of the Lieutenant-General Commanding. After entering the mouth we wended our way through serpentine sloughs, which at this point compose the river bottom. About 10 o'clock we arrived at Alaganick, a summer village of the Eyaks. This village is located at the base of the mountains, which base shows unmistakable signs of having been the seacoast in days gone by. These mountains are now 20 miles from the surf. The natives of this village were armed with the old three-band, brass-bound Springfield musket, and shoot home-manufactured bullets. The natives are indifferent shots at more than 60 yards, depending mainly on the spear for their fish supply. They are extremely lazy, and tricky, but are very amiable in their bearing toward each other, also to the white man. They are not hunters, and use their canoes as a means of transportation entirely. These are made out of trees hollowed out, and are beautiful models. (Fig. A represents a canoe, A the bow and B the stern.) The boats are about 18 feet long, have a 3-foot beam, and are handled with great dexterity in the sloughs and even in quite rough water. The Indians never ascend the river more than 8 or 10

miles as their boats are easily cracked, and in the terrific swash of rapids they would stand a poor show. On June 22 my party was still in camp No. 3 on the slough near the village. The insects (mosquitoes and black gnats) hovered around our faces in myriads, rendering it necessary to anoint our faces, necks, hands, and in fact every part exposed to their attacks. A solution of sweet oil and tar was found to be very beneficial for their bites and stings.

June 23 the headman and medicine man of the tribe came into camp for a talk. These Indians are very slow and consult the entire tribe on all propositions. But as we were the first American party that had ever visited this section I did not think it strange. The medicine man said that his people were afraid of the upper river natives. That they had murdered the traders sent up by the Russians, and were continually fighting among themselves, and that the river was not navigable for even a bidarra at the stage of water we wanted to ascend it. While talking with the headman and medicine man, almost the entire village came into camp. I showed them my carbine, which was big medicine for them, I having shot a seagull sitting on a log about 350 yards distant while at Nuchek for the edification of the natives. The natives never shoot at a greater distance than 75 yards. I also showed them my watch, chronometer, and field glasses. The effect was electrifying. The medicine man, who spoke Chinook, then asked me to come over to a dance, which is about the same thing as smoking a pipe of peace with the Indians of the plains. The invitation was accepted and I agreed to be at the casina when the sun reached the top of the totem pole standing in the center of the graveyard, which was located on the top of a knoll about 100 feet high and below the main village.

As the sun neared its position we noticed an unusual stirring of the natives and a number of small canoes passing into the sloughs leading to the casina, containing women, children, and old men. Taking our bidarra Dr. Robinson, myself, and interpreter, with side arms only (they being held in greater fear and more incomprehensible to the natives than a rifle, as they fire so often without reloading), we followed the narrow and tortuous channel of the slough and landed in front of the casina, which is constructed and used as follows (see Fig. B):

The casina is a native hotel used for visiting and passing friendly tribes. All entertainments are given at the casina. The shaman met us at the landing and escorted us to the door of the casina, announced our presence, when an old man ushered us to seats of honor in the back and center (A A), fronting the entrance. The seats were covered with a piece of white drilling. Our left (B B) was reserved for the performers and the singers; the remainder of the house was filled with the native audience. The old native that conducted us to our seats was master of ceremonies, having a young man for doorkeeper.

At the striking of an Indian drum on the outside, the same as used by the plains Indians, seven squaws entered, with faces painted red and black and hair and persons ornamented with swan's-down, and took station facing the dancers and with backs to the audience, their left flank resting on ours. On the right flank sat the drummer. At a given signal from the master of ceremonies the squaws began a low chant, time being kept by the young Indian with the drum, when through the door, which was opened sufficiently to admit him, a young man representing the "totem" of his family, followed by a second, third, fourth, the shaman, sixth, seventh, eighth, and ninth, their relative positions being determined by the headman and medicine man. The actors having entered, all chanting, and taken their positions, the shaman in the center with his wand in his right hand, a signal to the orchestra was given and the music ceased. The actors turned their backs on the audience and rested for five or six minutes. At the command of the shaman a chant was offered. The music was established, but the words were improvised by the central actor to suit the occasion. This was continued in a similar manner by other actors.

On June 24 I attempted to get started for the glacier, but on account of the water being too high the natives refused to go with me, notwithstanding bribes of blankets, etc. But after a great deal of trouble we got under way in small canoes, feeling for the channel. The current at points in the river was terrific. On the towline were several members of the expedition. The oars became useless in the strong current, and as the undergrowth grew so close to the brink of the river, and was so thick and impenetrable, the only course left was to wade up the river bed.

At times members of the expedition plunged into water over their heads, as they came to deep holes not visible in the muddy water. After a hard day's work the expedition camped on what they took to be the main channel. The mosquitoes were fearful. Great difficulty was experienced in keeping the natives from being downhearted, as every little while could be heard a terrible concussion of some kind at which the natives would put their hands over their mouths and look very much frightened.

June 25 the expedition again broke camp at 8 o'clock in the morning, and after traveling about 6 miles came to a bluff. As far as the eye could reach were sand islands (3 and 4). Some of these islands were covered with a dense growth of alder, and those that were not were covered with drift, which resembled chevaux-de-frise. A more ghastly sight it is hard to imagine. This, with the gray-colored waters, formed a foreground of 20 or 30 miles broad, backed by a range of snow-capped and glacier-laden mountains. On the right the expedition was flanked by range after range and peak after peak. Wherever the eye rested it met snow and glacier. After sewing up the rent in the boat, which had become snagged, we again started on our mission, the water growing very cold and rapid.

At sundown the expedition again went into camp and fought mosquitoes as usual.

On June 26 camp was broken at 7 o'clock in the morning, when the Indians refused to go any farther. Finally they were induced to go 3 or 4 miles farther up the stream. This consumed about nine hours, when it became evident that it would be simply murder to ask the natives to go farther, as large drift logs would be sucked down by the under current, drawn under, and then shot up with a force that would send the log through a stronger boat than the one in use by the expedition. Then too, in addition, the ice was growing larger in size and more frequent in its passage. In view of these facts I concluded to camp on an island and wait for the water to fall. The Indians were paid and the bidarra was sent back to be repaired by the squaws at Alaganick. The Indians agreed to start up stream in fifteen days.

On July 2 we crossed the river, and commenced the ascent of the mountain range on the left. This range is from 2,500 to 3,000 feet in altitude. In the afternoon we came to a perpendicular wall which could not be ascended. A sufficient altitude, however, was gained to see far to the northeast a high wall of ice visible as far back as the eye, aided by a field glass, could see. To the north and almost adjoining the glacier on the northeast I saw another monster glacier moving off to the northwest. In front and to the east lay a collection of thousands of small islands, varying from one-sixteenth of an acre to 50 acres in size, surrounded by a light-gray liquid varying in breadth from a mile to a small stream and in depth from 20 feet to an inch, the mean depth being about 3 feet where I stood, and about 18 inches farther down. This was Copper River, that I thought might be ascended by a steamer for 50 or 100 miles. The question presented was that of descent. For 500 yards the expedition must cross the snow and at a dangerous angle, and below the snow lay a bed of rocks.

As I was the first up I was the first also to start down when my foot slipped and away I went. For a time it was doubtful as to my landing, but by using my feet and a stick vigorously I gained control of myself near the bottom in the soft snow.

At this point, on July 3, the shaman of Alaganick came into the camp and tried to dissuade me from trying to go farther up the river during the summer stage of water, assuring me it was an impossibility of going to Taral, the first village above the glacier just below the Sushitna River distant 150 miles from Alaganick, which I afterward proved to be false to his entire satisfaction.

On July 4, after following the slough all day, passage was found for one large boat to a point about 3 miles farther up the river and just below a large drift dam.

On July 5 the large boat was loaded at daylight and the expedition started for the point selected the day above referred to, and arrived at camp No. 7 about 11 o'clock, unloaded and started back. It took less than half an hour to run down, while it took six hours of the hardest kind of work to ascend. The boat was loaded again, dinner was cooked, and the expedition started upstream, towing the canoe astern. Camp was reached at 10 p. m.

On July 6 camp was abandoned. In this expedition I embarked in a small canoe with 2 days' rations, accompanied by Mr. Homan, the guide. The object of the expedition was a further

exploration for a channel among the islands and bars. Our course was east or across the river, in order to strike one of the main channels, as we could not get past the drift dam which backed the water up in the western streams and forced it through the outlet at such a rate of speed that we could not be cordelled against it. So we paddled across the stream as best we could and carried and dragged the canoe across bars and drift banks till night, when we camped on a small sand bank and started a fire to dry our clothing. We were wet up to our necks and it took us until long after midnight to get dry, when we scraped the fire off the warm, dry sand and went to sleep.

On July 7 I broke camp at sunrise and continued the journey to the east. The water was getting very cold. Bear and mountain-goat signs were numerous. After eating dinner, a northerly course was pursued in which one of the main channels was struck, down which large quantities of ice were floating. The problem that now presented itself was to get back to camp. To do this was no easy task, as there were a thousand channels flowing in different directions and running rapidly. The river at this point was about 15 miles wide. The sides and bottom of the canoe were by this time getting very tender. They had been worn very thin and had been cracked from stem to stern, which made the canoe leak like a sieve. So, kneeling in the water in the bottom of the boat, which rode the current waves like a duck, we started southwest for camp. Of my many canoe voyages this was the most exciting I had ever experienced. The drifts formed by sand bars would back up the waters which, finding a weak point, would cut a narrow channel through and down this rapid, and the little boat would almost fly. With a little stroke of the paddle, first to the right then to the left, the boat would be made to dodge a projecting log or bowlder which, if it had collided with either of them, would have smashed the boat like an eggshell and deposited the cargo on the next drift dam. Camp, a distance of 27 miles, was finally reached about dark.

On July 10 all the forces at hand were put on a bidarra with half a load and started upstream. Considerable trouble was experienced with the Indians, who are inveterate liars, and were they not cowards explorers would stand a very poor prospect of exploring the country. Misfortunes were met with at this juncture, as in going up the stream the bidarra ran on a sunken snag and ripped itself open for a yard or more and barely reached shallow water before she filled. On repairing the skin, camp was broken on July 12 early in the morning. By cordelling first the bidarra and then joining forces on the old Russian boat for a mile or so upstream, a point was reached on which I had previously left a portion of the rations when the bidarra met with the accident above referred to. Camp was made on an immense gravel bed of many thousand acres in extent, the deposit of Goodwin Glacier (No. 5) so named in honor of Maj. W. E. Goodwin, U. S. V., a resident of Philadelphia. The water had now grown so cold that it was impossible to make any headway against it. Wading deeper than midway between the knees and trunk, one would be paralyzed after submersion for fifteen or twenty minutes so that all draft power was gone for a time, forcing the men to let go the towline and run up and down the bank to warm themselves. The water was running off a bank of ice of many thousands of acres in extent, and its effects were beginning to show themselves upon the men, whose members were becoming more or less rheumatic and swollen.

On July 13 the reports caused by falling ice from the face of Childs Glacier (so called in honor of Mr. George Washington Childs, of Philadelphia) and Miles Glacier (so called in honor of Brig. Gen. Nelson A. Miles) were terrific, and the ice floes in the river at times precluded all navigation. At this point the natives begged to go back and were again bribed to help the expedition as far as the lower edge of Miles Glacier, and accordingly, started across the river to its easterly connection. Getting in an eddy the boats were cordelled to the most advantageous point, while the man in the bow and the one in the stern held its prow to the current. The men took to their positions and, all being ready, the men with their oars went to work. I steered, taking the water at a quartering angle, sometimes being swept back a mile or so only to try it again, and if the ice proved too thick and the current too swift, another channel was tried. In this manner the men worked their way over to the easterly bank and made camp again for repairs.

On July 15 the expedition broke camp at daylight and continued its journey, ice floes constantly passing. The progress was very slow, as the men had to chop a trail or towpath on the bank and lay to whenever they saw an ice floe coming. A short while after sundown camp was made in a little cove which protected it from the ice floes. Here the natives positively refused to go any farther until the river fell. In crossing the head of a rapid slough the ice demolished a small canoe and almost drowned the natives. The large boat narrowly escaped the same fate. Mr. Homan, the guide, lost his footing and was swept some distance downstream, but fortunately caught some bushes and escaped. The water fairly hissed, carrying with it bowlders, some of them 2 feet in diameter, the impetus of which would break a leg or rip the bottom out of a skin boat. These bowlders, gravel, and sand are dumped into the river by the gigantic glaciers above referred to, and when swept downstream form bars and islands. The natives having deserted, I secured the stores and began preparations for further explorations by land, as the floating ice precluded canoe navigation.

From July 16 to July 29 we worked on a trail from camp No. 10 to Miles Glacier, cutting out a route over which to pack the canoe and rations, it raining constantly during the interval. The river was blocked with icebergs many times and backed up four feet, leaving a large flat densely covered with a species of a most rank growth of nettles. To guard against this evil is a precaution which should be taken. Being exposed to the cold rain the sense of touch becomes dormant. In cutting the brush this weed will strike the laborer in the face and on the hands, leaving its injection to be developed at night when the several members are warmed by the latent heat of the body. The poison, aroused by the combined action of the blankets and camp fire, causes the most excruciating pain and renders the man unfit to work for a day or more. At the time I visited this region bear were quite plentiful, the species being the black and brown bear. The latter is to be approached with caution, as it is inclined to be combative, particularly when wounded. Its flesh is inferior, as an article of food, compared with that of the black bear, which latter is more amiable in disposition.

Most of the night and day of July 21 was spent in watching the river and building a levee in front. On the left flank of the camp, the roar of the water forcing its way between the icebergs, some of which were from 300 to 500 feet long and half as broad and from 30 to 80 feet thick, was deafening. The trails cut in the river bottom by these bergs are often excavated to a depth of 20 feet, and as they come scouring down the stream carrying a deck load of passengers in the shape of bowlders, some of which weigh tons, they shake the river banks for some distance back from its brink. On the night of the morning in question I beheld one of the grandest spectacles ever witnessed by living man. First, bergs came majestically sailing down stream, passing and repassing each other as the force of the water backed up by their united presence became sufficient to force them through the sandy bottom of the river, which they in turn ground to a fine composition, similar in color and consistency to the deposit found under a grindstone after the sharpening of tools. These monsters differ in color. Some are white, others black, and yet others (the latter predominating) are of an aquamarine color. As they backed and filled they somewhat resembled the maneuvers of a fleet of men-of-war. By observation I estimated the discharge of Childs Glacier to be as follows: (C. and D.) The breadth of this glacier as cut by the river, which runs at right angles to the flow of this field of ice, is a trifle over 3 miles; its mean altitude is 400 feet; discharge per day, from June 1 to August 31 (ninety-two days), 3 inches, giving over a face of 336,000 square feet, and 23 feet deep, 8,160,768,000 pounds per annum. This mass of ice passes any point 5 miles below the glacier, where the river divides, and the ice runs aground and melts.

On the 31st of July a bidárra, loaded with fur and manned by 10 upper river natives, hove in sight. On seeing the flag they landed. Some of these natives had never beheld white men before, it being their first visit to the trading station, Nuchek. (1 and 2.) After examining those present they proposed a trade. Ranging themselves for a dance, they displayed the black and silver-gray fox, bear, martin and other furs. The trade was declined. Tea was given them and then negotiations were opened for their assistance up stream on their return. They promised to assist us, and after a day's sojourn, for the rain to moderate, we started south.

I made it a point to display the carbines, pistols, etc., of the expedition to these people, the greatest marvel to them being our field glasses. August 4 we endeavored to cross Miles Glacier (10), but found, after traveling over it for about 8 miles, that it was so cut up by fissures that a passage over it was impossible. This consumed the interval between August 4 and August 14. On August 15 the passage past Childs Glacier was commenced. Everything not essential to life was abandoned. With the natives from Eyak and Alaganick, who returned on the representations of the "upper rivers" that they were going to take the expedition up, the canoe was packed, the bidárra having been abandoned. While it was more liable to be split than the bidárra was to be torn, yet the canoe could be handled more easily in swift water from the camp on the slough by the trail cut over to Miles Glacier. Every man in the party packed his share, about 100 pounds.

August 20 Copper River was crossed above Childs Glacier and another portage commenced past the rapids. A trail was cut along the bank for some distance and then we went into camp. The coast Indians here turned back, as they feared to go farther. The upper river Indians also declined to have anything to do with a canoe in such rough water. The river at this point narrows down to 150 yards from edge to edge of water. (12.) The difference in summer and fall is 20 yards. The spring rise is more than 40 feet, and the current runs from 10 to 15 miles an hour in the center of the stream at high water. This unusual rate causes a swash that throws the water up the rocky bank 10 or 15 feet. The receding water carries every comparatively light obstacle, i. e. bowlders weighing seven or eight hundred pounds, back into the water. The route now is to cross the river where the water is less tempestuous. As it makes a turn to the left (looking down stream) the opposite or right hand bank receives the full centrifugal force of the pent up river. But to do this the voyageur must have a crew of experienced paddlers. In the bidárra of the natives were eight Indians and one white man, all expert hands with the paddle, giving them nine effective men. But in the path of this force, in the center of the stream and about 300 yards below the point of departure, were a series of breakers about 12 feet high. The feat to be accomplished was to reach the opposite shore (the left bank) without being engulfed by these breakers.

The men referred to started at the highest obtainable point and laid their course. Those remaining watched with bated breath as they neared the fatal spot. Some Russian officers, it is said, lost their lives here. A break in the under current, which caused the surface water to boil, whirled their boat out of its course, when it mounted the opposite side of the first breaker and then disappeared in the hollow of this huge wave. When those present thought all was over the boatmen again appeared, but apparently in distress. It appears that just missing the first breaker their boat could not meet the second, which broke off her keel and tore a long rent in the skin. The boat filled with water and its impetus alone carried it into a shallow eddy, where it sank and was pulled out for repairs. From the head of this rapid to the crossing point, about 3 miles, it took this crew of eleven six days to make the distance. In some places they had to lift their bidárra up a bluff 20 feet high. During this period it rained in torrents, and as all tentage had been abandoned, we kept warm by heating flat stones, rolling them in wet blankets and hugging the blanket and stone; but with all prudence the men suffered many aches and pains.

On the seventh morning natives returned with the white man, John Bremner, a prospector. Their manner seemed more unfriendly. One of them took some of the cooked rations and passed it around to his friends in a rather defiant manner, and in addition stole from us some small articles. They said that this miner could go no farther than the first village, Taral, and must then return. Being convinced of the unwarranted risk of leaving the canoe and starting out on foot, at the then late season, without rations, I felt satisfied that the only course left was a winter journey, as I had been informed by the upper river Indians and those on the coast that a shorter route existed via Port Valdez over the mountain to the lake, the outlet of which ran into Copper River below the Chettyna. On this river is found copper in its various stages of purity, and as some of it is said to contain a high percentage of silver it is used by the natives for bullets and for barbs to arrows. This deposit is, I believe to be, about 30 miles up the river referred to, from its confluence with the Copper River. The country is of glacial formation, as is the entire

country from Mount St. Elias to the extremity of the Kenai Peninsula, running as far north as the sixty-second parallel of latitude.

Starting downstream on the morning of September 1 about 3 miles were covered, when the rapids forced the expedition to make a portage, as in running the first set, which looked comparatively smooth, the canvas was split and the men were afraid to take the second, which was full of rocks, and the water shoal in places. By this time we were very much stiffened up by exposure, and progress in making the portage was very painful and slow. Having packed everything below the rapids, camp for the night was made and I went downstream on foot to explore a passage to the main river, I being in a side channel. The river below the point at which the upper river Indians crossed splits into four large channels. The water rushes down these channels at a terrific rate of speed into a large basin (see Miles Glacier field map of 1884 accompanying report) formed by this monster glacier in days gone by, when it was more powerful and had more resources. It is said by old Indians that the river once ran under this glacier which filled the valley (Childs and Miles glaciers being united) and I am convinced that such was the case, as roches moutonnées now form the bed of the valley. The evidences are unmistakable, as the valley is glaciated in all directions. In fact, the mouth of the river, and the bar far out at sea, were formed by this glacial action.

The water had now fallen so much that it left a very ugly rapid at the mouth of the slough. The bowlders were so large and numerous that the canoe could neither be gotten over or past them. So, packing the instruments below this point to the bank of the main river, we started down the rapids on the morning of the 2d. Our course lay between two large rocks, about 6 feet apart, through which we had to shoot if we wished to reach the river in safety. All being ready we started and a landing was effected on the opposite bank. After watching the face of Childs Glacier for an hour or so, having taken extended observations, we attempted to run the rapids in front of that glacier. Although the current runs about 8 or 12 miles an hour, the expedition was apparently more than an hour making the lower end of the glacier. In reality the passage was made in about twenty minutes and in safety. The old Russian boat was hauled from the slough in which it had been cached and put into the stream with a feeling of security. The boat was filled with water to swell the seams tight for the sea voyage to Nuchek.

September 4 found us in midstream making from 10 to 15 miles an hour. After a hard day's work (it was now getting quite cold) a camp was made some miles above the northwest fork during the night. Early in the morning of September 5 advantage was taken of the outgoing tide and the boat was headed for Cape Witshed. The weather was stormy, with rain and wind. The sea ran very high. About 10 a. m. the wind and rain increased, shutting out the land and leaving us to navigate by compass alone for the remaining portion of the day. In the afternoon it blew a gale, which forced us to seek shelter on a small island, to which we were guided by a native in a small canoe. The sea ran so high that it required constant bailing to keep the craft afloat. And yet the small canoes (A) did not take in a bucketful of sea water all day. On the following day the storm still raged and the waves lashed the island until the shore was covered with sea foam knee deep.

September 7 we put to sea again, the wind having died out only to leave a terrific swell, which gave us some trouble in launching the boat. Having gotten well offshore, our course was laid toward the southwest end of Hawkins Island. The attempt failed, as a head wind sprang up shortly after 12 o'clock and drove the boat ashore. September 8 a passage was made through the strait between Hawkins and Hinchinbrook islands and camp was established about 10 miles to the east of Point Johnson. On the following day the expedition arrived at Port Etches. On September 10 we started for Port Valdez in a large canoe manned by three natives, and which also contained a Russian half-breed, Lieutenant Brumback, and myself. After an uneventful voyage across Prince William Sound we arrived at Plutoniffs Barrabora (F), on the north side of Port Fidalgo.

The next morning, accompanied by a half-breed son of an old Russian, who acted as guide, the portage was passed. About 8 miles from Plutoniffs Barrabora, and about equidistant from Ports Valdez and Fidalgo, on the mainland, being a long narrow island which shelters the shore

from the storms of Prince William Sound, which affords the inhabitants at all times smooth water in which to launch their bidarras and bidarkas (G), the guide pointed out the remains of a village, now "a city of the dead." This was thought to be one of the largest villages on the sound. Its history, as related by the old Russian, is as follows: Some years ago, probably twenty or thirty, the portage was used entirely by the Upper River Indians, who came down Copper River to the stream heading in the lake, which not being previously named or visited by white men, is designated as Lake Margaret. Up this they traveled to the lake, hence to the foot of the passage. Here they left their bidarra and packed their furs over to salt water, where bidarras were furnished by the Chigachimutes for the voyage to Port Etches. For this service the Upper River Indians paid a tribute in furs, not only for the biddara, but also for the privilege of passing through the country.

On one of their periodical tours there arose some disagreement, and words led to blows. The result was the annihilation of the Copper River party by the Chugachimutes. This occurred in the spring. In the fall an epidemic of some kind carried off over half the inhabitants of the village, which caused the remainder to flee not only from the epidemic (which they attributed to the powers of the shaman of the Copper River natives), but from their wrath. I believe these people should be feared. After the fight above referred to the Upper River Indians adopted the route via the mouth of Copper River. It is now used by them in the month of March, when they come down on the frozen river, in May after the break-up, and in September when the river has subsided.

Passing this village of the dead, I followed the right shore to Port Valdez, admiring the colossal mountains on each side of the inlet. These mountains are more or less covered with glaciers. In the rear of these mountains rises another range, previously referred to, the estimated altitude of which is 6,000 feet above sea level. From all the information I can gather, printed or oral, I am of the opinion that all of the mountain ranges of northwestern Alaska are concentrated on the Kenai Peninsula. Rounding a sharp turn in the inlet, the portage lies between two mountains, the valley being filled with a large glacier. (H). The estimated altitude of the highest point of this portage is about 2,500 feet, and from the base of the mountains on the west to the lake on the east is about 15 miles. With the altitude above given it is difficult to cross. Camping as close as it was possible to get to the west base of the portage, the evening meal was cooked by the side of a small stream. At the mouth of this stream I beheld a sight often heard spoken of by the natives, but never believed. The bottom of the lake was covered 4 or 5 feet deep with dead salmon. In the stream were thousands, from the strong, vigorous fish to the emaciated, scarred and almost decomposed shadow giving its last kick to keep its head upstream for a mouthful of fresh water ere it joined its dead comrades in the lake bottom.

On the morning of September 12 the expedition started up the trail at daylight, two half-breeds in the lead. Each had a blanket and a dried fish. Myself and Brumback carried a blanket and overcoat, rolled up in which was some frying-pan bread for supper and for breakfast to partake of on the lake. After a most arduous climb for six hours we reached the glacier in the following order, viz, half-breed Russian, son of Plutonif, myself, Nicholi Necolsky, half-breed from Nuchek, and Lieutenant Brumback. After traveling an hour or more the fog settled down and we could not see more than 50 yards. About this time a call from the rear was heard from Lieutenant Brumback. The first impression was that he had fallen down one of the crevasses or fissures in the glacier, and that the half-breed was calling. But on hailing him it was found that he was taken with violent cramps in the muscles of his legs. On returning to him he was found lying in the snow. I agreed to go far enough to see the lake and locate its outlet and return for him. The snow was now very soft and rotten and the guide fell through. Had I not been close at hand to drag him out, the guide would have lost his life. No one could see the bottom of the fissure, but water could be heard rushing past in the darkness below. After locating the lake and its outlet, I returned and found Lieutenant Brumback still on the snow. The guides informed me that the snow was too thin for packing, but that in two months the passage could be made in safety. On returning to camp, which was reached after dark, I found

my feet partly frozen. All was made ready for an early start back the next day, and on the morning of September 13 the expedition started west in a pouring rain. After a most trying day in the rain, Plutoniff's ranch was reached.

On September 14 the expedition started to cross the sound. After running about 10 miles the sea ran so high that the expedition sought a small cove for the night. On the morning of September 15 another attempt was made to cross the sound, but it was found that the sea was still too high, and the party was again forced back and made camp for the night. On September 16, the wind having moderated and the sea gone down, camp was broken at daylight and the men headed for Hinchinbrook Island. After paddling about 15 miles a light haze was noticed coming through the passage between Hawkins and Hitchinbrook islands. The steersman's attention was called to it and he headed the canoe more to the east. It appears from Indian accounts and observation that, an hour or sometimes less before a severe blow from the mouth of Copper River, this light fog is generated by the terrific surf on the bars. As the fine salt spray rises it is blown in through the gap referred to by the incoming wind. The rate of the wind can, by observation, be determined, giving the traveler warning in this direction. When the cloud appears it is not well to put to sea until it has passed, for in a half hour after this signal was sighted the gulf was lashed into a foam by the wind. In heading the canoe east the gale drove us before it at a high rate of speed. Nothing but being swamped could now prevent our boat from making Johnson Point.

The salt spray now became blinding and every wave gave the canoe a contribution as it passed by. Even by baling my best, the canoe got half full of water, which almost stopped its headway. The natives now lost heart, as reaching the shore looked very uncertain. But by threats and promises of rations we got far enough inshore to get out of the heavy sea, and by paddling as men do on such occasions only, the head of the canoe was kept to the wind until she was baled out. Then with the addition of another paddler she was run ashore. In the meantime I had taken in so much salt water during the struggle that after the excitement was over I was completely exhausted, as was also Lieutenant Brumback, whose action upon this occasion saved the party from being drowned. Late in the afternoon Nuchek was reached, where dry clothes and plenty to eat were found.

On my hearing that a man by the name of Lowell owned a small schooner then at anchor in "Sunday" or Recreation Bay, on the south coast of the Kenai Peninsula, I sent two natives thither and made arrangements to hire this schooner, January 1, to transport us from Nuchek to the Portage. Thus ended the summer's exploration.

I beg to take occasion at this point to call attention to a river known on the map as the Sushitna, emptying into Cook Inlet, about 61° 15′ north and 150° 30′ west, as a means of water transportation for troops entering the interior of Alaska. On the east side of the Kenai peninsula apparently concentrate all the mountain ranges of the Pacific coast east of and including the Rockies. These ranges catch the moisture from the south and east, filling the valleys with glaciers and snow to the very edge of Prince William Sound, while on the west side the slope is gradual to the waters of the inlet. The seasons of the inlet are regular and the soil capable of producing various vegetables and subsisting a limited number of stock, which can not be said of any other part of Alaska that I know of.

Regarding the Aleutian Islands as a stock country, I quote literally the following views of Mr. Ivan Petrof, at the time I write in the customs service at Kadiak. This gentleman, who is exceedingly well informed upon the subject of which he writes, says:

> There have been repeated attempts to raise stock, cattle, sheep and hogs, in large herds within the borders of Alaska. The subject is one in which the Russians first naturally took a deep interest, and they brought over hardy selections from the Siberian stock, placing the cattle at almost every point of importance, for trial. The result was that the herds of Kadiak Island proved the best. Here there is fine ranging ground for pasture, and in the summer there is the greatest abundance of nutritious grasses. But when the storms of October, freighted with snow and accompanied by cold and piercing gales, arrive and hold their own until the following May, the sleek, fat herd of September becomes very much worn and emaciated by June. It has given its owner an undue amount of trouble to shelter and feed. Hay suitable for cattle, or at least to keep cattle alive, can be cut in almost any quantity desired for that purpose. But the stress of weather alone, even with abundance of food, depresses the vitality of the stock, so that

the herds of Kadiak Island have never increased to anything approximating a stock-grower's drove. The herds rarely exceed 15 or 20 head at the most. Notable examples of small flocks of sheep, which have been brought up since the transfer and turned out at Unalaska, Onga, and elsewhere, have done well. But the severe winters are not so cold as protracted. The weather is so violent that the animals have to huddle together for weeks in some dark, low shelter. This causes a sweating or heating of the wool which is then detached and falls off, greatly emaciating and enfeebling the animals by spring. The practice of the traders at some places now is to bring beef cattle up in the spring from San Francisco. They are then turned out into the grazing ground on the Aleutian Islands, Kadiak, and even to the north. Here they speedily round-up, and flesh out into the finest of beeves by the middle or end of October, when they are slaughtered. The propensity of the hogs to devour carrion upon the beach deprives them of interest, and they are not encouraged anywhere.

From personal observation and from parties familiar with the district I am of the opinion that the garden spot of Alaska is Cook Inlet. As before stated, the mountain ranges on the east side of the peninsula catch all superabundant rain. These make the seasons more equable in regard to the fall of rain, which is a most demoralizing drawback to the progress of an exploring or attacking party at all times, summer or winter. In my opinion the key to that portion of Alaska drained by the Tanana and Copper is the Sushitna River. This river flows through a broad, level valley, thickly timbered and to the north of the network of mountain ranges referred to as forming the eastern coast of the Kenai Peninsula, and south of the Alaskan or Chegmit range of mountains, which bear to the right at a sharp angle in latitude 63° north and longitude 150° west, and run down the Aliaska Peninsula, forming the Aleutian Islands to the west. Old Fort Kenai consists of a double set of officers' quarters, a set of barracks, which are used by the Alaska Commercial Company at present as a store, and a storehouse, guardhouse, bakehouse, and a few other structures, and in a greater or less state of decay. The interior lining and the stoves of the quarters I am informed were taken out and sold; also a portion or all of the bricks forming the bakeoven.

This old post can be made a base of supply for a party of not more than 20. They should be provided with a stern-wheel scow, propelled by either mill or steam power (the latter preferred), for water transportation up the Sushitna and through its chain of lakes. As a means of land transportation I would recommend 10 hardy donkeys. I select these animals because they are more readily transported than any other pack animal, and answer the purpose of a larger beast. This would give 5 animals to each party. If the Tanana and Copper rivers were to be explored they would carry a canvas boat and provisions for the party for the summer. Instruments must be carried by a man understanding their delicate adjustment. Such a party could locate with greater accuracy in one season the now unknown district embracing the watershed drained by the Tanana, Copper, and Sushitna rivers of Alaska. Then, with any number of parties composed of two or three men, once at the head waters of a stream, its navigation becomes a mere trifle. From Indian reports and from the geographical formation of the country I believe that a portage of 100 miles from the head waters of the Sushitna would put the party on the head waters of any of the other streams. Forage can be gathered in the vicinity of Fort Kenai during the summer to keep the stock during the winter. The climate is not more rigid than that of Montana. Moose abound, furnishing an article of food preferable to beef. It is almost impossible for a party of less than 7 persons to explore and locate, astronomically, the position of the different features of a country, and report intelligently on its various resources. The reason for this is that there is not united strength enough to pack a canoe over a rocky portage without losing so much time that the summer is gone ere they get fairly started.

Indian Tribes.

Omitting extended mention of the Indians living south of Yakutat, already well known through several readily accessible accounts, this report will include those living on the coast of Alaska from Yukutat Bay to the island of Kadiak together with the Indians of the Copper River regions, embracing Thlinkets, Ugalentse, Aleuts, and Kenites upon the coast; Midnoóskies and Colcharnis upon the river. Representatives of all these tribes were encountered with the exception of the Kenites and Kamagamutes, a brief account of whom, derived from various sources is inserted to complete the gap, which would otherwise be left, between our observations and those made by the reconnoissance of 1883. The estimates of population have been based upon personal observation and inquiry among the natives themselves, and upon the statements made by traders and prospectors. Taken in comparison with previous estimates, chiefly from Russian sources, it is not to be doubted that the entire native population of Alaska has greatly diminished in number since its first encounter with the whites. The cause of this will be briefly considered hereafter. Whether or not this diminution be still progressing generally is open to question, that it is in certain instances, has been established by abundant evidence.

THLINKETS.

The Thlinkets, or as they were called by the Russians, Kolosh, a name still in common use, are by far the most important tribe in Alaska, from their numerical strength, their character

and disposition, and from their occupying districts closely adjacent to white settlements. They inhabit the coast from Copper River to the Southern extremity of Alaska, never, except as traders, penetrating far into the interior. More or less marked differences exist between the language and habits of the various tribes enumerated below, but detailed consideration must be limited to the last two.

(1) Hydah tribe, closely related to the Thlinkets, living on Prince of Wales Island; (2) the Sitka tribe; (3) the Prince of Wales Island tribe; (4) the Tongass tribe; (5) the Stickeen tribe, on Stickeen River and Etholin Island; (6) the Takoo tribe, on Takoo River and Inlet; (7) the Auk tribe, on Douglas and Admiralty islands; (8) the Kekh tribe, on the Kekh Archipelago; (9) the Khootznoo tribe, on Admiralty Island; (10) the Hoonyah tribe, Chichagof Island; (11) the Chilcat tribe, on Lynn Canal; (12) the Yukutat tribe; (13) the Chilcats, of Comptrollers Bay.

As the Yukutats are the only coast Indians living in the region to which this report pertains with whom trouble might reasonably be anticipated, they are, although not very numerous, of considerable importance. Probably the fact that intercourse between them and the whites is almost entirely limited to occasional visits from trading vessels, and to the periodical trips to Port Etches, explains the absence of any disturbance in late years. The Russians were unable to maintain a trading post at Yukutat with any ordinary force, and finally abandoned the attempt after the destruction of their buildings seventy years ago. The Alaska Commercial Company has made no effort in that direction, preferring to let the natives do their trading at Port Etches or, as it is commonly called, Nuchek.

The murder of a white man a few years ago, for which crime the native murderer was executed by the process of law, is not necessarily to be taken as an index of the general feeling of the tribe. It grew out of a quarrel between some prospectors and three Indian boatmen, and in revenge for a beating one of the white men was killed; active participation was limited to the criminal's own family. The visit of the "man-of-war" upon which the murderer was taken away, and the exhibition of the power of her guns, particularly in throwing shell, produced a very salutary effect in checking any hostile tendencies. When the U. S. S. *Adams* subsequently visited Yukutat and landed a party of prospectors, the Indians received them civilly, furnished boatmen and canoes, and expressing the utmost anxiety lest some accident might befall them that would be attributed to Indian agency. The chief himself selected the Indians to accompany the party with great care, saying that all of his men were not to be trusted.

Two trading schooners touched there during the past season, and although meeting with but little success in trade, had no trouble with the natives unless excited by hoochenoo, of which they are exceedingly fond, and under the influence of which they become very quarrelsome. They can hardly be considered hostile, although they are not all to be trusted under temptation. In personal appearance the Yukutats do not differ from their southern brethren. They are coal-black, have coarse hair which is worn of moderate length, possess reddish skin, have high cheek bones, thick full lips, and are of medium stature. Ear rings are quite commonly worn, nose rings much less often. The hideous lip ornament formerly so much in vogue among the Thinklets living farther south has never been worn by the women of this tribe. The usual summer clothing of a man is a light cotton shirt, and a pair of drawers, supplemented in colder weather by a blanket of parkee. Over rough ground, boots made from the skin of the hair-seal are worn; some covering of the head is usual; it is either a hat obtained from the trading post or is made from mink, squirrel, or martin skins.

The village of Yukutat proper consists of six large houses built above ground in the form common to this part of the coast (see plans). They are square structures of logs and slabs or roughly hewn planks, with a bark or thatched roof, leaving an opening in the center for the escape of smoke, and each will accommodate several families. Around the sides within are closet-like divisions used ordinarily for storage, but convertible to sleeping apartments, although too low to admit of standing up, and too short to admit of lying at full length. The floor is of hardened earth and, as may be expected, cleanliness is not an object of solicitude. A few miles below Yukutat are three similar houses.

During the summer months these Indians wander along the coast in their canoes. They are

governed in their movements by the running of the salmon, the presence of the seal and sea otter, the ripening of berries, and the necessity for visiting the trading post. Away from their permanent villages they occupy summer houses at the points where the length of their stay is considerable, or build temporary shelters of brush. In winter certain villages are regularly occupied, and travel except upon landlocked waters almost entirely ceases. The results, therefore, of our enumeration of these natives at any one village might differ greatly, taken at one time or another.

The number of able-bodied males belonging to the two villages at Yukutat may, with close approximation to accuracy, be stated as 100.

To the behests of their chief, Vanduk, considerable attention is paid, although his authority does not extend much beyond the two villages above mentioned, and his influence and power is much less than that possessed by his predecessor, Skin-Yah, who died in Sitka five years ago, and whose authority was respected from Yukutat to the mouth of the Copper River. The present chief is well disposed toward white men, although not sure of his ability to control some of the unruly members of his tribe. Of equal if not greater importance is the shaman or medicine man, whose unbounded influence over the natives is due to their implicit belief in his supernatural powers. A rival shaman, paralyzed from an apoplectic seizure, affords to them satisfactory proof of his ability in this direction, and although so heartily disliked by the majority that they once requested a white man to kill him, his opposition or favor might become of serious moment to small parties of white men visiting this part of the coast. He is a man of about 50, possessed of considerable natural ability, and not particularly well disposed toward the whites. He speaks a few words of Chinook, but no Russian. These Indians, together with those living in the villages to be described hereafter, are fairly well supplied with old-pattern guns. The favorite weapon, as with all the coast tribes, is a double rifle and shotgun combined. The rifle barrel is 44-100 of an inch caliber, and carries its ball with tolerable accuracy for 100 yards. The shotgun barrel is 14 to 16 gauge. No breech loaders are known to be in their possession, and if this were the case they are not owned in sufficient numbers, nor are the people possessed of enough wealth to tempt illicit traffic in fixed ammunition; therefore, for certain purposes, notably sea-otter hunting, the use of the bow and arrow is continued.

The trading is principally at Nuchek, to a lesser extent with trading schooners, and occasionally with canoes from Sitka. Tea, tobacco, sugar, powder, ball lead, percussion caps, calico, axes, a few blankets, and a small amount of clothing are the articles purchased. In past years they have been accustomed, on visiting Nuchek, to take possession of the settlement, compelling the Aleuts to take refuge at Port Chalmers, some 20 miles distant, during their stay, and causing considerable anxiety to the traders. Although this practice ceased seven or eight years ago, it, with the remembrance of troubles during Russian occupation, is not altogether forgotten, and a certain amount of unfriendliness occasionally shows itself between members of the two tribes.

A few slaves are owned at Yukutat, but information upon the subject is difficult to obtain. About all that their masters can be induced to say is that they have owned them for a very long time. It appears from other sources, however, that up to twenty years ago the Hydahs, living on Prince of Wales Island, were accustomed to make raids upon the Flathead villages, carrying off their inhabitants, and selling them into slavery, receiving about $200 for an able-bodied male. This traffic, which had existed for a very long time, was finally broken up by the English, and has probably supplied the largest number of slaves. The Russians limited their interference to taking slaves whom they found to have been badly used, or who fled to them to escape sacrifice, to Wood Island, near Kadiak, where a colony was established for this especial purpose. Thence also were sent women who had been tied up and left to starve as a punishment for witchcraft, and of whose intended fate the Russians fortunately learned in time to intervene. The institution of slavery still exists. Male and female slaves are allowed to marry, by permission of their masters, but their offspring are slaves. They receive, however, much better usage than formerly, and fare, upon the whole, as far as material comforts are concerned, nearly as well as their masters. Years ago coffee bowls, often of immense size, beaten out from native copper, and knives from the same source, highly valued, were in use among the Yukutats and Chilcats,

but have since been superseded by those of other material. Middle-aged men remember to have heard of these articles from their parents, but never have seen them.

Although few of their canoes are equal in size or finish to those made by their congeners of the southern archipelago, the Yukutats have some excellent craft, in whose management they are remarkably proficient. Their largest canoe will carry fifty men. Very little ornamentation is noticed on them. The process of manufacture is briefly as follows:

The felled tree, when barked and raised into convenient position, has marked upon it the outlines of its intended shape. The rough work is done with the ax. After the one side has been given its proper form, at intervals of every few feet, a row of very small awl holes indicates the extent to which cutting can be carried upon the inside. This is completed with a peculiar shipping tool, something like the adze, but much narrower, with a slight hollowed blade set on a short handle at an acute angle. The finishing of the outside and the gunwales is done with a short, double-edged knife, curved on the flat. By the aid of hot water the canoe is then spread and the stretchers placed in position. The addition of square and high stern and stem pieces completes the work. Photograph 9 conveys a fair idea of a Yukutat canoe of medium size, with the end pieces removed. Such a canoe is valued at from $40 to $60, the large ones as high as several hundred.

The chief dependence of these Indians for food is placed upon the salmon, a store of which, sliced, but not salted, is accumulated for winter consumption. To a lesser extent they rely upon the flesh of the bear, mountain goat and seal, and on the various shellfish, plentifully found on every beach. Certain berries, roots, and plants are eaten in their season, but with the exception of a few berries which are preserved are gathered for immediate consumption only.

The quantity of salmon which a native can consume at a single sitting is remarkable, and if it be provided for him, incredible quantities of tea will be drank.

Christianity has made little or no advance among them. Some wore crosses which are recognized as being connected with the religion of the whites, but these are worn rather as ornaments than as religious tokens. The women are, as a rule, unchaste, provided they are paid for their lapses, and their male relatives often negotiate for the sale of their favors. Their "Totem" system, their legends, and their custom of giving "potlatches," although the latter is not carried to such extremes, are similar to those of the more southern tribes, which have been so often, well, and minutely described that further mention here is unnecessary.

Between Yukutat and Copper River are the following villages, whose population includes 100 able-bodied men. Most of the foregoing description of the Yukutats applies with equal propriety to their inhabitants, who differ in only a few respects. Each village has some man whose personal qualities or riches give him a certain amount of influence, but there are no chiefs in the full meaning of the term.

Going west, after leaving Yukutat, two small villages of three houses each, not constantly occupied, are found at Cape Yukutago. On the south side of Comptrollers Bay, just north of Cape Sucpling, is a permanent winter establishment of three houses, known as Buchta-lee, at the upper end of the bay. A short distance up the Chilcat River is another permanent village of four houses, Guch-la-togee. Three miles farther up are three large houses, occupied only during the fishing season. At Cape Martin are eleven houses. The Alaska Commercial Company abandoned its post here a few years ago as unprofitable. A few families sometimes winter on Kyak Island.

In the event of any serious difficulty, and the possibility of a general outbreak is very doubtful, the destruction of their villages and canoes would soon bring these natives to terms. This would be effected with a comparatively small force provided with small boats. There is no other tribe whose alliance would be looked for except the Ungalentsi, and their small numbers and general characteristics make them little to be feared as foes, or desired as friends. The chief difficulty would arise from the absence of good harbors, from which to start with expeditions, and the shallowness of the water approaches at all places but Yukutat. Light-draft but staunch boats would be required, in which a small howitzer could be mounted with great advan-

tage, and the time between June and September, when gales are less frequent and severe, should, if possible, be selected for operations.

UGALENTSI.

Near the mouth of Copper River is the dwelling place of a small tribe, distinct from the Thinklets to the east and the Aleuts to the west, more closely resembling the former than the latter, but speaking a language of their own. They have often been considered to be of Innuit or Eskimo origin, but competent philologists recognize in their language elements that ally them with the Tanana or Athabassare tribes of the interior. The name Ugalentsi was given them by the Russian traders, but they do not employ this name in speaking of themselves. They call their principal village Eyak, and designate themselves by the same name, at least in addressing strangers. A large proportion can speak Thinklet, a smaller Aleut. The village is situated on a small stream flowing from a lake into the tide water about 8 miles to the westward of the extreme western mouth of Copper River. It consists of a dozen houses built of logs, slabs, and roughly hewn planks. At high tide it can be reached from the east by boats, and from an arm of the sea extending inland from Cape Whitshed. In going down from Eyak to Nuchek the latter route, although involving a short portage across a marsh, is preferred on account of its saving something in distance, but more particularly as avoiding the rough sea common off Cape Whitshed. No seagoing vessel can approach nearer than the head of Prince William Sound.

Besides Eyak the chief village is a small fishing station, Alaganik, on one of the innumerable branches of Copper River, 9 miles from the western mouth. Here upon a small island are two houses of the general type already described, and upon the mainland near by are five more. Boats drawing over 18 inches of water can not, except during the season of high water, and even then only at flood tide, approach nearer than 2 miles. The population of this village is constantly changing, few people living there in winter. The Ungalentsi can muster 33 able-bodied men, a number only as large as has existed within the recollection of a man of 50, according to a subchief, who furnished this information. Accident and disease have reduced them; several have been lost while sealing; others while otter hunting, and 10 perished at one time, being swept away by an avalanche while in pursuit of the mountain goat. Their number can not, however, have been very great, for the highest Russian estimates have never placed the entire population at over 200.

Intermarriage with the Thlinkets, Aleuts, and to a slight extent Midnooskies, has destroyed whatever regular personal characteristics might have once distinguished them. The description given of the appearance of the Thlinkets applies very well to the Ugalentsi. These tribes dress in the same manner.

Their nominal chiefs are invested with very little real authority. The wealthiest men usually exert the most influence, a not surprising condition of affairs. In the supernatural powers of the shaman considerable faith exists, but not amounting to implicit trust. The degree of belief might be sufficient to cause delay and a demand for increased pay when disaster was predicted, but not enough to deter them from joining an expedition if the reward was sufficiently great. A previous interview with the prophet would save some annoyance in this respect. Although an Eyak himself, the shaman often with them is a half-paralyzed Thinklet, who speaks a few words of Chinook and English. His influence has been somewhat lessened by his misfortune, which is ascribed to the superior power of his rival at Yukutat.

Like the rest of the Coast Indians, the Eyaks are armed with the double rifle and shotgun combined. The old musket is used for sea otter, and occasionally for seal, but they also use the bow and arrow. The bow is not very powerful, although sufficiently so for the short ranges at which it is employed. While it throws an arrow fairly well, the bowmen show no great degree of skill. The arrow has a detachable barb fastened to the shaft by a thong of twisted sinew. This arrangement leaves the point implanted in the body of the seal, or otter, and not only tends to interfere with the animal when it dives, but also impedes the animal's attempts at escape. The fish spearhead, by which the larger part of the supply of salmon is secured, is of similar construction. Neither is, however, peculiar to this tribe.

To an accustomed eye, the slight ripple made by the salmon in the tinted waters of the

river is almost unnoticeable, but the keen and experienced vision of the native seldom deceives him, and a thrust is not often made in vain.

Situated as they are without trails, the water is their highway and the canoe the universal means of transportation. They own no large ones. Those in common use are 15 feet in length, 18 inches beam when spread, round bottomed, sharp at stem and stern, and weigh from 80 to 125 pounds. They will carry two natives or, upon an emergency, three, with their supplies for a week. (See sketch.) In experienced hands they will ride out in safety a considerable sea, provided it is not breaking, and in open water, where rocks, brush, floating logs, or ice do not endanger them, are exceedingly serviceable. For river work they are not so satisfactory, as in addition to readily capsizing they are easily split by a blow. Much care has to be taken, also, that when not actually in use they are kept constantly moist in the shade. They are valued at from $4 to $6, and every native owns one or more. Even the children are expert in their management. The bidarka in such general use to the westward is not used to any extent by the Eyaks.

Missionaries have not visited these people, at least not in recent times. They are fairly intelligent, and were anxious to understand the many unfamiliar objects they saw, asking the English names of each, and endeavoring to acquire English phrases. Under circumstances to which they are accustomed, a fair amount of personal courage is shown, but when removed from their own particular surroundings, timidity is the rule. They fear the Indians of the Upper River, although no trouble has ever arisen between them. The glaciers, the rapids, the cows at Nuchek—in fact everything with which they do not habitually have to deal, they are timid of. Their opposition to any organized force brought against them would not be much, neither would their assistance against hostile demonstrations of any other tribe. They are fairly muscular, and even endure much fatigue and hardship when pressed. A bidarkah crew paddled cheerfully from 5 in the morning to 11 at night, with scanty food and short rests, knowing that their village would be reached that night. But under circumstances less in accord with their own wishes, fatigue was soon complained of, and although they would rise before dawn to prepare and eat breakfast, it was no easy matter to get them started on the day's journey. But little confidence can be placed in their continued compliance with the terms of an agreement, as the least obstacle is likely to give rise to a demand for a new bargain; and no bargain can be closed without the most complete and ample discussion by every man and woman present. Women occupy a more important and desirable position than with most uncivilized races. Their opinion is consulted on all points of moment, and their share of the work is not excessive. Marriages are contracted at an early age without much formality, and the tie is easily dissolved. Children are kindly treated, and the men do not consider it unbecoming to take charge of them at times. A proposed journey, the arrival of strangers, the return from a successful hunt, any extraordinary occasion has to be celebrated by a dance. One at Alaganik, to which an invitation was extended by the Shaman, and which seemingly was gotten up in honor of our arrival, was attended by the entire population, men, women, and children. A sort of tambour, sounding not unlike the ordinary bass drum, supplied the music. When the audience had seated itself and the chorus had taken its place, leaving a portion of the floor free for the dancers, the door was suddenly thrown open and in sprang a grotesquely arrayed native with painted face, who went through a variety of contortions strongly suggestive of the convulsions of nervous disorders. Before taking his place in the arena reserved for the performers, four females who took minor parts assumed their places quietly, and all began a monotonous chant, accompanying it by motions of their bodies. This concluded, each male dancer, holding in his hand feathers, or objects, the significance of which does not appear, came to the front in turn, danced energetically, sang and recited, the chorus following. The ceremony was kept up several hours and was repeated in a modified form upon subsequent occasions. In some parts of the west their dances are to assist the incantations of the Shaman. But this did not seem to be the purpose at Alaganik, and to inquiries as to its object the only answer was that it was merely a dance, and had no other meaning.

ALEUTS—CHUGACHIMUTES.

The natives living on the shores of the Gulf of Chugach, or Prince William Sound, belong to the Innuit, or Eskimo family, and were designated by the tribal name of Chugachimutes, or Shugachimutes. In like manner the native inhabitants of Kadiak belong to the same family, and were called Kamagmutes. The Russian traders, however, classed them all as Aleuts, a name probably belonging to the aboriginal population of the Aleutian chain of islands, and the Unalaska Peninsula. It is by this name that they are called at present, not only by their Thlinket and Ugalentsi neighbors, and by the traders, but also by themselves. There is considerable difference between the language spoken at Nuchek, at Kadiak, and on the adjacent shores of the Unalaska Peninsula. Although they can all understand each other now, the differences may have, in times past, been considerable. Quite a number of words of Russian origin have found their way into the language, and are used in apparent ignorance of the foreign derivation, especially by the younger people. In this and other ways the language must have undergone material changes. Many years ago, that is, toward the close of the last century, and the early part of the present, the Chugachimutes were regarded by the Russians as fierce and warlike. Several conflicts between them and the trading parties occurred, and battles with the Kolosh were not uncommon. But since 1810, at least, a more peaceably inclined people could not be found.

Upon the shores of Prince William Sound are five villages, Port Chalmers, Chinega, Tatikluck, Cannikleck, and Nuchek. Of these the latter, where the trading post of the Alaska Commercial Company is situated, is the most important, and comparatively speaking, the wealthiest. They are all permanent villages. Each has a chief, and his authority is exceedingly limited and the advantages of his position slight.

The houses at Nuchek are better built and more comfortably arranged than elsewhere. Several have board floors and glazed windows, and are quite neatly kept within. Of their external surroundings as much can not be said, for filth of every description is scattered liberally about. The personal appearance of the men may be briefly described: They are of medium height, of fine muscular development, possess reddish brown skin, several shades lighter in the young than in older persons; have coarse black hair, scanty beards and mustaches, if any are at all worn. Earrings are their only ornament. Some of the women have quite attractive countenances. They are not a long-lived race, in consequence of constant exposure to cold and wet in their daily avocations. Then, too, their houses standing on soil surcharged with water, which, added to scanty clothing and unvaried dirt, fasten an hereditary tendency to pulmonary disease, which is exceedingly common amongst them. The age of fifty is seldom attained. Children are numerous, but comparatively few live to become men and women. Allowed to run about in snow and rain barefooted, and protected only by a single garment, particularly in the case of boys, those who long survive grow up with the seeds of disease implanted in their systems. The garments of civilization are largely worn, particularly at Nuchek, with the exception of boots and overcoats, seal-skin torbassars taking the place of one, and squirrel-skin parkees of the other. As a rule, generally, colors seem to have no attraction for the men, and the purchased clothing is selected with a view to utility only, with the exception of the hat. The favorite form is the ordinary stiff derby, neither durable nor serviceable. The entire population on the gulf is about 300 souls, of whom from 70 to 80 are able-bodied men. Its growth has received many checks. The tribe suffered in about 1838 from an extraordinary epidemic of smallpox, which swept away half the native population from Prince of Wales Island to the Arctic. In 1875 measles proved fatal to many, and several times typhoid pneumonia has almost depopulated whole villages. Former strength in point of numbers has never been acquired since 1838. Whether or not the tendency is toward a still further diminution is uncertain, but it seems quite probable that it is.

For subsistence the Chugachimutes rely mainly upon the sea and Salmon River, but are more independent in this respect than the Aleuts, to the westward. Although animal life is not abundant in the mountains surrounding the gulf, bear, goat, porcupine, and marmot occasionally

reward the hunter's perseverance. Wild fowl are abundant at certain seasons and a few remain the year round. No attempt has been made at agriculture, although some vegetables, notably turnip, would do well on selected ground. The wild vegetable products consumed are few in number and are in season but a short time. When actually engaged in hunting there is no lack of energy, but the necessity for providing for immediate wants is not recognized, except in the instance of drying salmon. If one more enterprising than the rest should secure ample stores of food or fuel he would be expected to share with his less provident neighbors when theirs became exhausted. The pursuit of the sea otter, although entailing some hardship and attended by some risk and uncertainty, would vastly increase the comforts of their existence if steadily engaged in. But unless driven forth by the desire to obtain goods from the trader, favorable opportunities are allowed to pass by. This applies more particularly to the residents of Nuchek, since it is the village nearest to the resorts of the otter, although this is partly accounted for by the present policy of the Alaska Commercial Company. In former times a fierce rivalry existed between this company and the Western Fur and Trading Company in the struggle to gain trade. Natives upon their return from successful hunting trips were welcomed by the agents with presents of tea and bread. Up to even the full market value in San Francisco would be paid for furs and almost unlimited credit accorded. In consequence many became deeply in debt to the companies, and so when the Western Fur and Trading Company closed its business it transferred its accounts also to its former rival. Natives found themselves charged with sums whose payment was impossible for years, especially as the prices paid for furs at once fell to the old standard. At present, when furs are brought in, half their value is applied to the extinguishment of these old debts, and the unfortunate native, suffering from the extravagance into which credit led him, gives up in discouragement and hunts only when compelled by pressing needs. Credit now is only given in exceptional cases. The Chugachimutes bring in sea otter, fur seal, bear, goat, land otter, and mink skins, seal oil and lovtak, or the prepared skin of the hair seal, which furnishes the material for covering bidarras and bidarkas. From the proceeds they purchase tea, sugar, flour, or hard bread, tobacco, ammunition, clothing, calico, and miscellaneous articles. A somewhat curious mode of using tobacco, common to the whole coast, may be mentioned here. An immense wad is moistened and mixed with wood ashes, preferably those obtained from a fungus growing upon the birch, although ordinary ashes will do. The mass is held in the mouth without mastication until a condition of half narcotism is reached. When it is taken out it is lent to some friend or stored away behind the ear, or in the hat. By the more elegant it is placed in a special receptacle until again required. Nine-tenths of the tobacco sold is used in this manner. The remainder is powdered after drying and is used as snuff, some of which is smoked.

The Chugachimutes use the same weapons that find favor with the other tribes of this coast, viz, the double rifle and shotgun combined, the smooth-bore musket, together with the bow and arrow, for otter. To the westward nets have been used by white otter hunters with very successful results, but this is not a method likely to be adopted by the natives.

Two kinds of boats, both of seal skin, are in common use—the bidarka, or covered boat, and the bidarrah, or open, which, except in Cook Inlet, entirely supplant the wooden canoe of the south and east. The bidarka is a Russian invention, and is intended for two or three persons. It is about 20 feet in length, has from 20 to 26 inches beam, and weighs in the vicinity of 85 pounds. (See sketch.) Its general appearance has been made familiar by often-seen pictures of the Eskimo kyak, which is to all intents and purposes a one-hatch bidarka. In stormy weather hooded shirts, made from the intestine of bear or seal, protect the bodies of the boatmen from rain and spray, and being fastened over the rim of the opening in which they sit effectually exclude the seas that wash over the top of their fragile craft.

The bidarkas are propelled by single-bladed paddles, and in expert hands will weather almost any storm. All natives, however, are not experts, and the trick said to be not uncommonly done among the northern Eskimo of upsetting and righting on the other side with their paddles only would appear to them as the feats of the circus ring do to horsemen in general. It is not a difficult matter for a white man to attain fair proficiency in their use. They are valued at about $20. The bidarras are open, flat-bottomed boats, from 25 to 30 feet in length, of 6 feet

beam, and are 4 feet in depth. A boat of this size with any considerable load requires for its propulsion eight or ten paddles and a steersman. Great care has to be taken in landing, as well as to guard against contact with brush or floating objects while under way. A very slight touch tears the thin and rotten lovtak, while the least scum of young ice cuts it like a knife.

For exploring and traveling the advantages of the bidarra are in its light draft, its capacity, the comparative ease with which it can be carried by its crew over short portages, and in the facility with which it can be repaired. Its disadvantages, then, are sufficiently obvious.

Nominally, these natives are members of the Greek Church. Christianity gained its first firm foothold in 1795, when over 700 Chugachimutes were baptized. At Nuchek there is a small chapel where service is read by a creole, the company's interpreter. It is reasonably well attended by natives of the place. In the spring, in hopeful anticipation of a visit from the priest at Kenai, they assemble from other villages, but for several years disappointment has been their only reward. The chief interest in the priest's coming is due to a desire to have the marriages contracted years previous ratified by the solemn ceremonials of the church. During a stay of six weeks at Nuchek, where articles useful to the natives were frequently left where they could have been easily and safely stolen, nothing was lost in this manner, nor was there any begging propensity, to which some of the other tribes are inclined.

Trouble calling for military intervention is never likely to arise with this mild and inoffensive people. In the extremely unlikely event of its occurrence, a boat's crew would be ample force to restore peace. The villages are all readily accessible, and are mostly on deep water, rendering possible the close approach of seagoing vessels.

THE KENAI INDIANS.

This tribe affords another example, if the Ugalentsi be admitted to be of the same origin, of Tinneh tribes impinging upon the coast. They occupy the shores of Cook Inlet, north of a line drawn from Anchor Point upon the east to just above Cape Douglas upon the west. Although frequently they go into the interior for hunting or trading, their permanent villages, with the exception of those in the valleys of the Knik and Sushitna rivers, are all upon or near the coast of the inlet. Within this territory, however, 25 miles north of Anchor Point, is a creole settlement, Ninilchieck, which is not included in the estimate of population, and possesses some interest as being a place at which attempts at agriculture and stock raising have met with considerable success. The cattle are of the small Siberian breed, and have done fairly well. Enough vegetables, such as the potato and turnip, are raised, not only to supply home wants, but to allow of a limited sale to traders.

In early days they gave the Russians much trouble, and were only partially subdued in 1786, when 1,000 of their warriors, and this must be a very large overestimate, who had set out with the intention of attacking the fortifications of Shelikoff, the first Russian trader of note, were encountered by him and his Aleutian allies and defeated with great loss. By the close of that year, however, the whole tribe was fairly well under control, and would, no doubt, have settled down to a condition of permanent peace had not their warlike disposition been fostered by being called upon to assist the agent of Shelikoff in his quarrels with a rival company. In 1799 Buecenof removed this element of discord by sending the Russian disputants to Siberia for trial and punishment, and subsequently to Kenaitze, since which time they have as a tribe been well-behaved and peaceable.

The number of permanent villages occupied by the tribe at present is 14, including 4 on the Knik and 2 on the Sushitna. The houses of the tribe are built of logs, each upper log being carefully hollowed out so that it fits closely to the lower. In general appearance and internal arrangements the houses do not differ much from those already described. The better class have, however (see plan, Fig. F), small buslike additions, and are entered only from the inside. They are tightly framed and put together, and have plank floors, which are used as sleeping and sometimes as bath rooms. In personal appearance these natives differ from their Innuit neighbors upon both sides of them. The height of the male is greater than that of the male Innuit. These Indians are slim and sinewy, with prominent nose, eyes set straight in the head, mouth large,

with thick, full lips, skin a shade darker than the Aleuts, and their hair, which is thick and coarse, is worn quite long. The nose and ears of the men are often pierced for the insertion of the white shells of the Hygua. On the coast and toward the southern point of the inlet civilized garments are largely worn, and many other customs of the white men adopted. But in the valleys of the Knik and Sushitna rivers deerskin shirts and trousers are still in use, the men and women dressing nearly alike.

The weapons of these Indians are the muzzle-loading guns heretofore mentioned, except at the head of the inlet, where double-barreled shotguns of small gauge, carrying either ball or shot, are somewhat in favor. It is said that quite a supply of rifles was obtained after the wreck of the vessel at Anchor Point in July, 1868, upon which was a battery of the Fourth Artillery then proceeding to take station in the vicinity. But this is a statement needing confirmation before it can be accepted. Ammunition is obtained at the trading posts of the Alaska Commercial Company at Kenai, Knik, Tyoonok, and Iliamna.

The means of subsistence of the Kenaitze vary with the locality in which they live. At certain seasons salmon and oolachan are to be found everywhere. Toward the upper part of the inlet large game is found, caribou, moose, and goat existing in considerable abundance. The skins of these animals, together with those of the brown and black bear, wolf, lynx, beaver, mink, and muskrat, are offered for sale in sufficient quantities to warrant the maintenance of several trading posts. To the southward, sea-otter hunting is the most profitable pursuit in which they can engage. The baluga, or white whale, is less sought for now than formerly. Their boats also differ with localities; about Anchor Point and Iliamna, bidarkas and bidarrahs, obtained from their Kamagimute neighbors, are employed; while farther north, skin or birch-bark canoes are used. The Kenaitze are nominally Christians, although many of their old superstitions are still in force. Traders, who had to deal with them, especially with those living on the Sushitna and near Tyoonok, give them the reputation of being honest and fair in their transactions. The women, while not harshly treated, are given heavier tasks than fall to the lot of their Chugachimute or Ugalentsi sisters. Marriage involves some formalities and more than one wife is an exception.

Like the Yukutat and Chilkat, Kolosh, and the Ugalentsi, these people entertain some curious ideas respecting the tribes living far in the interior of the country upon whose shores they dwell, which must from their nature be purely fabulous. Thus the Kenaitze have a tradition that not over two hundred years ago the mountains northward were inhabited by a race of giants, who occasionally made raids upon their villages, and whose personal strength and size were such that the unfortunate Kenaitze who fell within the grasp of these monsters would be seized by their feet and killed by their heads being knocked together, after which their bodies were stored away in the parkees of these giants.

Before reaching this race, however, the country of the Kuitchans or Colcharnis, who were cannibals, had to be traversed. The importance of such beliefs as have just been mentioned, in the tribes inhabiting the coast, is due to the fact that their agencies and traditions have established a character for the tribes of the interior which is more than likely undeserved.

Operations against the Kenaitze would be chiefly by water, and the necessity therefor is not likely to arise. They are, however, less dependent upon the sea for their means of subsistence than any tribe yet described, taken as a whole, and the destruction of the seacoast villages would not of necessity end a campaign. Cook Inlet presents some difficulties of navigation on account of the excessive range of the tides, creating currents that, in the absence of favorable winds, might cause serious trouble, at least to sailing vessels. In winter navigation above English Bay is suspended, as the inlet becomes filled with floating ice. It is also worthy of remembrance that the climate approaches that of the interior, and that in winter, toward the head of the inlet, from 30° to 40° below zero is not an unknown temperature.

KAMAGIMIUTES (ALEUTS).

These people inhabit the island of Kadiak and some adjacent islands, the shores of the peninsula of Alaska, from Cape Douglas to Ivanoff, and a few villages on the southern extremity of the Kenai Peninsula. As before explained, originally called Aleuts by the Russians, this

name has adhered to them, although not resembling the true Aleuts in any respect beyond the general color of their skin. There are 13 villages on the shores of the island of Kadiak, 7 on the peninsula of Alaska, 1 each upon Spruce, Wood, and Alaganik islands, and 3 on the Kenai Peninsula whose inhabitants are in the main part Kamagimute, and number about 1,800 souls. Besides this, in a few other villages, and mixed with the full-blood native population in those just enumerated, live 800 creoles or Russian half-breeds.

In personal appearance the natives do not differ much from the Chugachimutes already described. Their ordinary clothing is largely purchased from traders, and almost the only aboriginal garments still worn are parkees, ramlupas and seal-skin boots. Their houses, too, are similar except at such villages as circumstances have rendered more wealthy than others, notably at Karluk, where a salmon canning establishment, operated by San Francisco capital, gives employment as fishermen to some sixty natives; and at Aktalic, whose inhabitants have been extraordinarily successful in the pursuit of the sea otter. Ordinarily the natives do not long remain in possession of money.

The mode of traffic adopted by the Alaska Commercial Company and followed by the few other traders who visit these regions is to pay for furs or services in half dollars, without the checks or immediate barter commonly used in dealing with Indians elsewhere. As a rule the money thus received is returned at once in payment for merchandise. At many villages on Kadiak, and especially in the two just mentioned, much of the money earned is not immediately expended, and considerable is reserved for future needs.

Of the ancient manners, customs, and traditions of this now half-civilized people so little remains that what might be of small interest from an historical point of view would be out of place in a report of this nature.

No circumstances are likely to arise to call for the intervention of armed forces.

COPPER RIVER INDIANS.

On account of the natural obstacles to travel through this region, and the scanty outfit offered to adventurous traders by the comparative poverty of the natives, but little is known concerning the aboriginal inhabitants living on the head waters of the Copper River. As early as 1819, Kleminskoff attempted to ascend the river and failed. Inehreninkoff in 1848 was more successful in this respect, penetrating some 250 miles into the unknown, but there met death at the hands of the natives. The Russians for a few years maintained a trading post not far from where the Chettyna empties, but abandoned it on account of the danger and expense attending the transportation of their stores. Two years ago the Alaska Commercial Company sent an agent as far as Taral to report upon the advisability of establishing a trading post at that point, but upon his adverse report relinquished the intention.

The sources from which the information here submitted were obtained are as follows: Ten Copper River Indians passed us on their way to Nuchek, remaining at our camp several days, and again staying in our immediate vicinity upon their return while waiting for the water to subside. Conversation with them was carried on at some disadvantage, two interpreters being necessary, but they seemed perfectly willing to give any information they possessed, describing the country and drawing rough maps of the course of the Copper River. In addition to this, our Thlinket interpreter had made the journey before, and to some extent his narratives were of value. But, as before mentioned, the habit of the Coast Indians to ascribe the most improbable characteristics to tribes living in the interior, made his account one to be carefully scrutinized before accepting. From the agent of the Commercial Company at Nuchek, who was visiting Taral, and who had for several years dealt with the regular trading parties, information was also obtained.

Four languages are spoken on the river, Midnooski, Not-thelze, Hot-not-tani, and Colokooni. These names savor of Russian origin, but, at least in speaking with white men, are the ones employed by the members of the respective tribes. However, even with those speaking the same language, the most remarkable differences of pronunciation occur; therefore it is not possible to feel assured of the absolute correctness of these designations. The suffix "Kohatana"

or "Te-na" seems closely allied to the Hot not-tani, and signifies with the Indians of the interior simply "people." At Nokhotana the name given to the Copper River natives is the Kenaetis.

Their first village, called Taral, is 150 miles from the mouth of the Copper River. Its population varies according to the season, but probably never exceeds 60 souls. Between it and the Colokoni country, a distance of 100 miles, are eleven more villages, whose total number of inhabitants may be 350 or 400.

In personal appearance the men are of medium height, lithe, thin, and sinewy, and possessed of much endurance. The color of their skin is more inclined to a strictly reddish shade than is found among the coast tribes. Their hair is usually worn long, and upon occasions of special moment their faces are painted; ear and nose rings of brass are not uncommon. The crew of the bidarrah met on the river were mostly dressed in clothing purchased at Nuchek. But at their villages buckskin garments, ornamented more or less profusely, are in general use. Fur parkees, usually of squirrel skin, are their protection against the severe cold of the winter.

Nuchek, the point at which their trading is done, is visited thrice a year. When the ice leaves the river in the spring, they follow it down, returning before high water. Another trip is made in August, or when the water has begun to subside; and a third on the ice toward the end of the winter. At this latter period rough sleds are used, upon which are carried about 300 pounds per man. They offer for sale skins of the bear, deer, fox, lynx, as well as smaller skins, and parkees, which last are purchased for shipment to stations in the west, where they are exchanged for tobacco, calico, tea, ammunition, sugar, and a little flour and clothing. For the load of furs brought down in August $350 was received.

Although no one man exercises control over any great extent of country, much influence is exerted by an old, blind chief, who years ago is said to have taken a prominent part in opposing the advance of Russian enterprise. His son, a lad of seventeen, was one of the brightest and most intelligent natives that was met. Respect for authority was more marked with them than with any tribe previously encountered, and prompt obedience followed an order from the sub-chief who was in charge of the village.

In this party only one gun was carried, but as every pound was a matter of importance in view of the frequent portages, it is not to be assumed they are not well provided with fire arms.

The agent of the Alaska Commercial Company, already mentioned as having visited Taral two seasons ago, stated that they were well supplied with guns. Their favorite weapon is a light double-barreled shotgun of about 16 gauge; this carries a ball fairly well for the distance at which their game is killed. Bullets are pounded out from bar lead, and the nearest gravel bank supplies abundance of shot. A few wore knives in Colchoona fashion, suspended from their necks in more or less elaborately worked sheaths resting upon the front of the chest, and one carried a Remington navy.

The boat in which the journey to Nuchek was made was an old bidarrah, so much the worse for use that it seemed scarcely seaworthy, and required extensive repairs before the return trip could be entered upon. After reaching Taral, trails are found upon which most of the travel goes on, and there are but few boats upon the Copper River, one or two bidarrahs and a few canoes being all.

In the management of their bidarrah they were not only much more expert in bad water than the boatmen of the coast, but were equally superior to them in point of courage, taking risks cheerfully that the Eyaks would have absolutely declined.

As well here as elsewhere might be mentioned facts, a knowledge of which might be of service to future expeditions, in regard to articles for purpose of trade. Money—that is, in half dollars—will be taken, although reluctantly, by those who have themselves visited posts. But the most acceptable and easily transported article with which packers and boatmen can be paid is tobacco; next is tea, which will be found especially convenient if the latter be compressed, as is the case with some put up for the Siberian market. The tobacco sought for is a strong black natural leaf. Tea may not necessarily be of very good quality, but must be black, because green was considered worthless. Coarse brown sugar, which is taken with tea in Russian fashion, is preferred to white, and in general use. It may be said that any attempt to substitute a different,

even if a better, quality is likely to be regarded with suspicion. This applies more particularly, of course, to the tribes of the interior, although measurably true of those upon the coast.

As would naturally be supposed, Christianity has made little progress among the Indians of Copper River, although a few traces of Russian teaching still remain. A cross is occasionally worn, and something like a Midnooski rendition of a formal prayer was muttered by the chief of the bidarrah when leaving our camp to resume his journey.

Two petty thefts were supposed to have been committed by some member of their party, but it is quite within the limits of possibility that the articles taken were presumed to have been gifts. One of them falling under the chief's notice was ordered to be returned. They are somewhat addicted to begging, more so than any of the coast tribes.

Slavery exists among them, but, as with other tribes, the sources from which their slaves were obtained could not definitely be ascertained, and the personal appearance of the one seen gave no clue to his origin. He was not badly used, and fared nearly as well as his masters; somewhat inferior clothing and the last chance at the food being the chief distinctions. Offenses against the lives and the property of white men traveling through their country might result from two causes—viz, in anticipation of, or interference with, their trade with the Colcharnis; or, again, to unruly members of the tribe committing overt acts for purposes of robbing. That no general feeling of enmity against the whites exists among those Copper River Indians living south of the Colcharni country seems a well established fact. They have never been credited with such feeling by the Russian traders who were last among them, two of whom were Creoles now living in Kadiak, nor with the present faction of the Alaska Commercial Company at Nuchek. It is quite conceivable, though, that a small party well supplied with tea, tobacco, flour, and sugar when the Indians have none might bring some pressure to bear on them tending toward a division, if not surrender, of these valuable articles. Instances of occurrences of a similar nature are not unknown in civilized communities.

The demeanor toward us of those seen was sufficiently friendly upon our first meeting. Some information was offered about the Copper River, and the advice was given to await their return, dictated probably by hope of gain, as they well knew that their services would be accepted. Much disappointment was expressed when it was found that trade was not the object of our journey, although they would have disapproved of traders going beyond their own villages. Upon their return the high stage of the water and their heavy load prevented the rendering of much assistance. They told a prospector who was traveling with them, or at least were said by our Thlinket interpreter to have done so—which leaves the matter open to doubt—that they did not wish him to proceed with them. Unless he was a trader they said he had no business up the river. But as their bidarrah was so heavily laden with their own stores, and travel at one part so difficult that six days were required to accomplish 3 miles, it is not surprising that they repented of a bargain to transport at least some 600 pounds of additional weight.

Should it ever become necessary to carry on hostile operations against these people the difficulties of a campaign would be enormous. To begin with, their country is only reached at certain seasons of the year. To attempt the ascent of Copper River at other than these seasons can only result in failure. Sixteen days is the best time made by the natives themselves in traveling from Nuchek to Taral, and not unfrequently twice this time is spent en route. It must be remembered, too, that this is done by men familiar with the river, and so much importance do they attach to this that the bidarrah we met was encumbered with an old man who took no part in the work, but was carried on account of his knowledge of the river. Experienced boatmen, accustomed to hardship and exposure from childhood, can carry a pack of 100 pounds over portages, while most men could only with great difficulty make their own way unencumbered. Then the natives can paddle without rest from sunrise to dusk. No Indian allies as scouts, packers, or boatmen could be secured near the mouth of the river, and even if any were inclined to take risks involved in such an expedition, their general character would make them of doubtful value. It may safely be concluded that any force endeavoring to reach Taral with hostile intent would attain its object, if at all, by its own unaided efforts.

With regard to the possibility of living off the country, wholly or in part, since the trans-

portation of the rations alone for the troops engaged would be a heavy task, it may be stated that when salmon are running even an unskilled fisherman can, in the main river, with a rudely constructed hand net, or by still simpler means in the small clear streams running into it, supply himself with fish. Wild fowl in spring and fall are abundant near the mouth of the river. Bear and goat are numerous, but from the nature of the country—the lowlands are covered with a dense growth of alder, and the mountains are rugged and precipitous—game is, therefore, hunted under great difficulties and secured only as the result of fortunate chance. Ptarmigan are frequently found on the Copper River and deer are fairly abundant, in summer at least. Men provided with means for securing them would be sure of enough food to prevent starvation. The nature of the equipment required would of course vary with the season. Fur clothing would be indispensable in winter, and mosquito bars almost as much so in summer. The latter may seem of trifling importance in active campaigning, but the depression and exhaustion from broken rest and irritation from bites might more seriously affect the chances of success than would at first be conceived possible. Bidarrahs, or somewhat similarly shaped boats, covered with canvas instead of seal skin, would be the best means of transportation.

The discussion of the route to be followed does not belong to this part of the report. Although a howitzer or gatling would have the most terrorizing effect, it is not probable that its transportation would be justified, the less so as no considerable force would be encountered at any one place.

COLCHARNIES.

Having finished the consideration of the Copper River Indians, under which head were included the Midnooski, Hot-not-tani, and Noo-thelze, whose permanent villages are upon the banks of the river, it only remains to describe the tribe occupying the country beyond them, variously designated as Colcharni, Koltshame, Kolsheni, or Kinlchani. The extent of territory which they occupy, or rather own, and over which they roam, has been considered very great, since Indians calling themselves Colcharnies have been seen on the headwaters of the Stikeen, at Kenai, on Cook Inlet, and on the Yukon. But it is by no means certain that these were all members of the same tribe. Kuitchani is a word of Tenneh origin, meaning far-away people, and might be applied to an Indian whose country was far distant, and it might be applied to an Indian whose country was far distant by several of the tribes of the interior. But little is known concerning them, although many half or wholly fabulous accounts have been given. They have been generally reported to be unfriendly and likely to oppose any attempt at the exploration of their country. But since they so seldom come into contact with white men instances of distinctly hostile acts are rare. That a Russian explorer was killed by them in 1848 is true, but as the circumstances of his death are not proven, this does not establish the fact that they are hostile to whites in general. The agent of the Alaska Commercial Company, when at Taral, saw a party of ten who had come down to trade. He states that they were somewhat uncivil to him and made threatening demonstrations with their knives. But as he was entirely alone, although well armed, it would seem that had their intention been to do him harm, it could have been easily accomplished, particularly as he was lying in his tent at the time, partially disabled as the result of a fall. The Midnooskies, who knew them well, and with whom they intermarry, say that they are quarrelsome. But whether this would justify the assertion that it was unsafe to go among them is uncertain. Some who visited the Yukon invited a white man to return with them, hoping that a trading post might be established nearer than that to which they were then forced to travel. About the most that can be safely affirmed is that while there is no possible proof of their hostile disposition, there is a possibility of trouble occurring should white men visit their territory.

In personal appearance they do not differ from the Midnooskies, judging from the single representative, who was one of the crew of the bidarrah met on the river. But as the fabrics of civilization are so expensive and difficult to obtain, their garments are universally of skin. Some seen of buckskin, although profusely ornamented, were of rather inferior workmanship.

Of their numbers so little is known that any estimate must be of slight value. There is

some reason to suppose that they are not very numerous, and information is equally as scanty concerning the location of their permanent villages, if they have any. Those at least who live on the extreme eastern headwaters of Copper River lead a more or less nomadic life, and the locality in which they reside at one time or another is determined chiefly with reference to their food supply. In winter the migration of the reindeer governs their choice, and they are found on one side or the other of the dividing range between their country and the Tanana, as the herd of deer may chance to wander.

They are said to be fairly well supplied with guns, which are of antiquated pattern, judging from those seen in the possession of a party visiting Fort Reliance, who were armed with Hudson Bay flint-lock muskets. The small-gauge double-barrelled percussion shotgun is, however, used to some extent by that portion of them who live on the main river just above the Midnoóski villages; and the same may be said of those who trade with the Kenaitze. The sources from which their ammunition and other articles, products of civilization are obtained, differ with the locality in which they range. Some come through the Midnoóskies who, acting as middlemen, of course have to be repaid by heavy profits for the labor and danger which their journey to Nuchek has cost them. Those living to the westward trade with the Kenaitze, who make long journeys into the interior to meet them. Formerly they met the Chilkat traders either at the glacier or at the head of White River, a journey of about 200 miles. But the larger part of their supplies come more from the trading post on the Yukon, especially since the establishment of Fort Reliance. It has always been generally believed that the Tanana Indians would not allow them to visit the Yukon, but there is pretty good evidence to show that at least that within the last two years the Colcharnis have appeared in person at the trading posts of the Alaska Commercial Company on the Yukon. Mr. C. G. Holt, the agent of the Company at Nuchek, saw when at Taral a Colcharni who told him that he had been to the Yukon. And Mr. F. McConkey, who has spent some sixteen months in prospecting on that river and its branches, states that he saw a party of three at Reliance whose identity was clearly established, and with whom he had considerable conversation through interpreters. There is no reason to doubt the gentleman's word, or the accuracy of his observations in this respect. The importance of this information lies in the possibility of the route by which the party came, which offers an easier way by which to explore the head waters of Copper River and the Tanana than is presented by the ascent of the former stream. The journey was made in winter, and the total distance between the Colcharni villages and Reliance was said to be between 250 and 300 miles. As to the manner in which their effects were transported my informant was unable to speak. The Tanana Indians use dogs as pack animals, harnessing them to sledges, and it is not unlikely that at least those Colcharnies who are in the habit of visiting the Tanana villages have adopted this method. Those with whom the Midnoóski crew were acquainted do not make much use of canoes; trails run everywhere, and except to cross the stream, boats are not required.

The furs offered for sale at Reliance were those combining a maximum of value with a minimum of weight. Deer or caribou skins did not repay transportation, and the money received therefor was expended in the purchase of powder, calico, and tobacco, but, rather oddly, not tea.

The only reason for dispatching any expedition with hostile intent against the Colcharnies would be to punish them for attacks on exploring parties or prospectors who had penetrated into their country, as otherwise, unless at Reliance, it is never within their power to injure white men. The remarks made on this topic with reference to the Midnoóskies are equally applicable. It might be possible, were the object to punish certain Indians, that the route from Fort Reliance in winter would offer the best chance for success, reaching Reliance by way of the head waters of the Yukon and Chilkat Pass, or ascending the river from its mouth in the open season.

It is doubtful if Indian allies could be secured from either the Midnoóskies or the Tanana Indians, although neighboring tribes often seem to fear and dislike each other. In this instance the feeling of enmity is not sufficiently strong to induce them to take any part in active warfare.

Although not belonging under this head particularly, a few words on the subject of interpreters might be of sufficient importance to warrant their introduction. To an expedition intending to explore Copper River, a knowledge of Chinook is practically useless, although a

few of the Yukutat Thlinkets have a slight acquaintance with it. Only at Nuchek, the starting point, where there is always a company interpreter, is Russian of much more value. It is necessary at first to have an interpreter understanding English and Thlinket, as no English speaking person has acquired a knowledge of Midnoóskie. The expedition was fortunate in securing the services of a Norwegian prospector, who had been some time in the country and had acquired a fair knowledge of Thlinket, and whose English showed but a trace of foreign accent. It is unsafe, however, to rely on finding one after leaving Sitka, and not easy to secure on short notice a satisfactory one at that point. Many Sitka Thlinkets, and half-breeds speak Russian. But of those who can be secured for such a journey, none had more than the most imperfect knowledge of English; still, with more time for inquiry one might be found.

The next difficulty is to get a Thlinket from near the mouth of the river who speaks Midnoóskie. There are but few who do, and from their nomadic habits it might be impossible to ascertain their whereabouts, or that known, to reach them. Then, if successful in penetrating far into the Colcharni country, a third, knowing the language, might be desired, since every Colcharni does nor speak Midnoóskie. Of course it is not pretended that all these interpreters, or even any, are absolutely essential, or that much information can not be gained through signs, but many opportunities of so doing are lost and disagreement created. Nor is it to be understood that they are to be exempted from work.

REPORT OF A MILITARY RECONNOISSANCE IN ALASKA, MADE IN 1885 BY LIEUT. HENRY T. ALLEN, SECOND UNITED STATES CAVALRY,

WITH

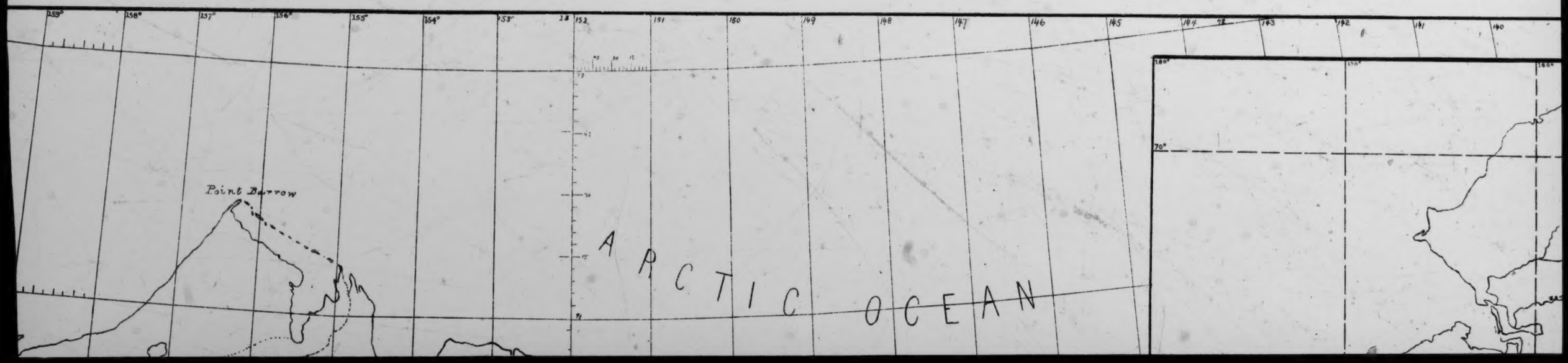
ILLUSTRATIONS AND MAPS OF THE ROUTE TRAVERSED.

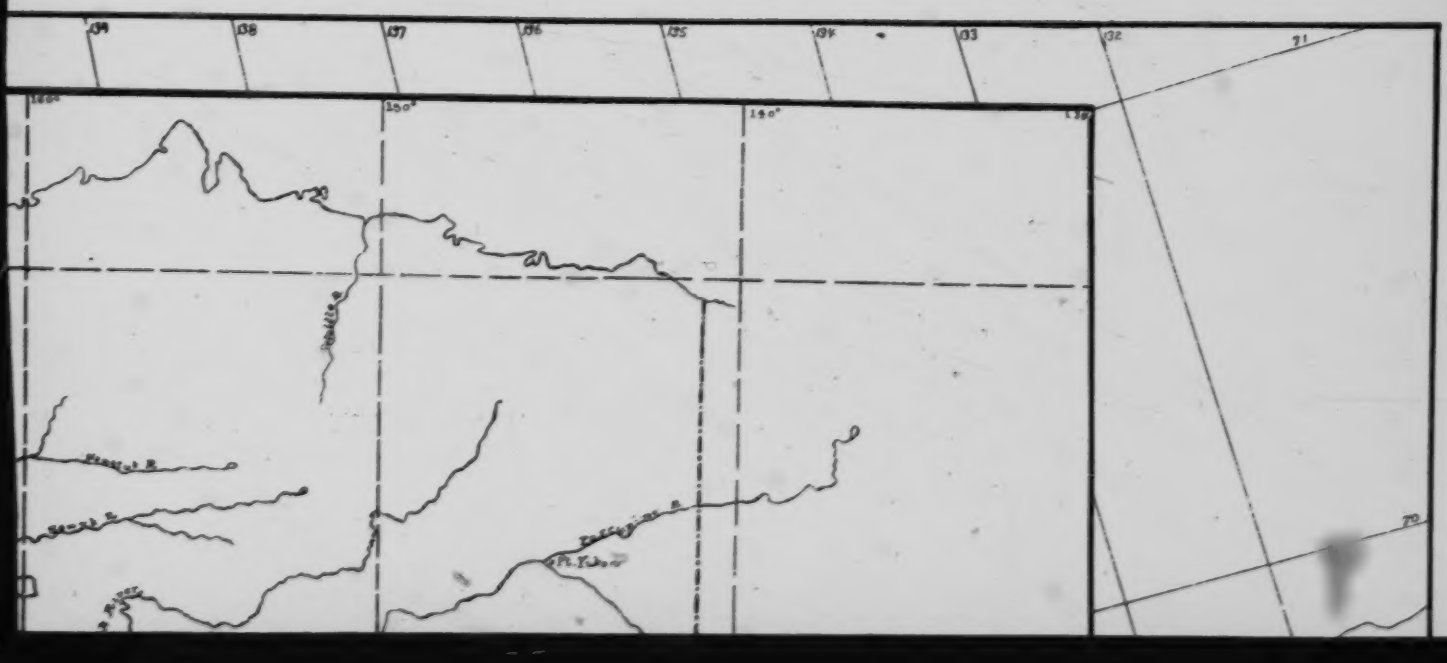
ALASKA,

NORTH OF THE 60TH PARALLEL.

SHOWING THE EXPLORATIONS OF THE PARTY

COMMANDED BY


Point Barrow
ARCTIC OCEAN


139
138
137
136
135
134
133
132
71
70
150°
140°
Yukon R.
Porcupine R.
Ft. Yukon

COMMANDED BY

LIEUT H.T. ALLEN, 2D U.S. CAVALRY.

NOTE The greater part of the Copper, Tanana and Koyukuk Rivers is included in the discoverses of the party Chart No 980, U.S Coast and Geodetic Survey, 1884, has otherwise been followed except as to most of the Yukon River, which is from the charts of Capt Raymond and Lieut Schwatka, U.S.A. and the Unalaklik River, which is from the field notes of the party

Drawn by

Lieut. Allen, J.H Colwell and Paul Eaton

in the

Adjutant General's Office, Washington, D.C

Geographical miles

Cape Dishburne

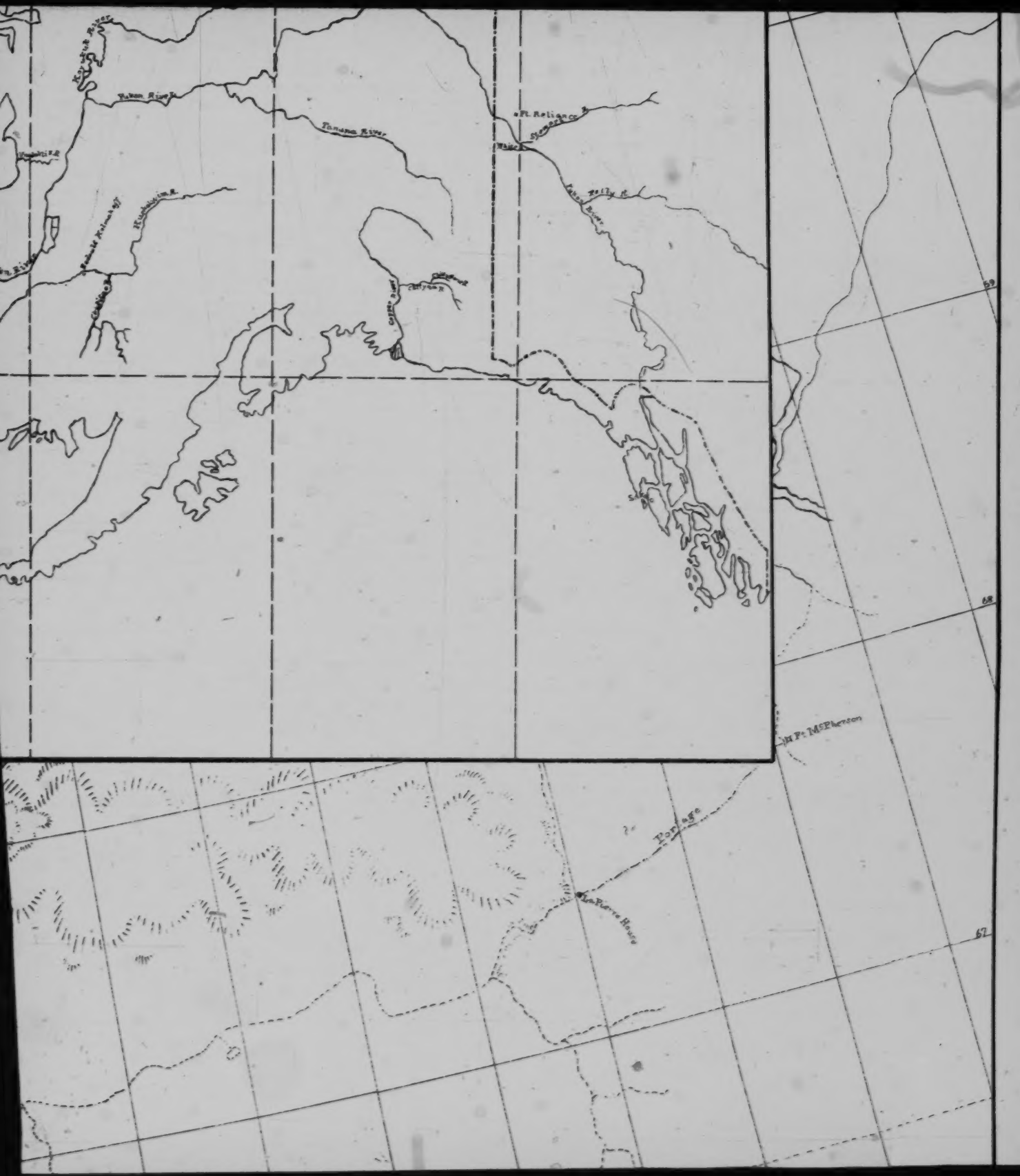
Pt Hope

Cape Seppings

Cape Krusenstern

Norton Sd

Colville R.


Yukon River
Porcupine River
Ft. Reliance
Stewart River
Mayo
Pelly R.
Pelly River
Hootalinqua R.
Teslin R.
Carmacks
Ogilvie River
Dawson
Selkirk
Mt. McPherson
Portage
La Pierre House
68
67

Cape Spencer

Cape Prince of Wales

Pt. Spencer

Cape Darby

Cape Denbigh

Arctic

Porcupine R.

Arctic Circle

Fort Yukon

Yukon River

Yukon River

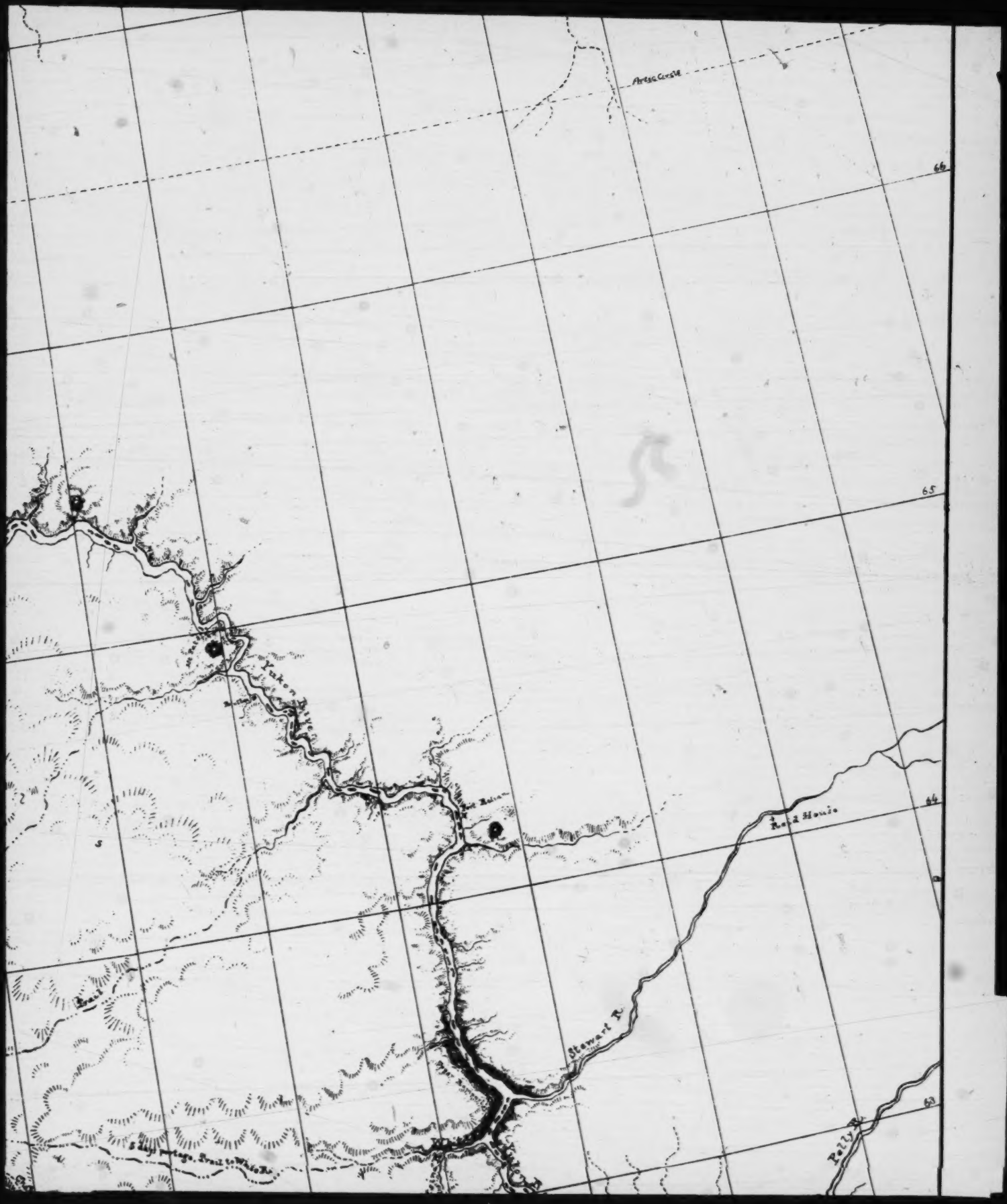
Indian Village

Lake Mapenglekakat

Yukon R.

Var. 32° E

2,000


Arctic Circle
66
65
64
63
Yukon River
Dawson
Fort Selkirk
Fort McPherson
Peel R.
Rock House
Stewart R.
Pelly R.
Trail
Trail
Trail to White R.

C. Romanoff

Pastol Bay

C. Romanoff

Kuskokwim River

Hazen Bay

Baird Inlet

C. Vancouver

Nelson Island

Kuskokwim River

62°

61°

60°

165°

164°

163°

162°

161°

160°

159°

158°

157°

Alaskan Mountains

Alaskan Mountains

Kowak River

Selawik R.

Noatak R.

Kobuk River

Yukon-Charley Reservation

Kotzebue Sound

Hotham Inlet

Port Clarence

Port Safety

C. Rodney

Cape Prince of Wales

Diomede Islands

Kruzof Island

Sitka

Chichagof Island

Admiralty Island

Baranof Island

Kuiu Island

Prince of Wales Island

Revillagigedo Island

Annette Island

Ketchikan

Wrangell

Petersburg

Mitkof Island

Kupreanof Island

Kuiu Island

Frederick Sound

Stephens Passage

Chatham Strait

Icy Strait

Glacier Bay

Lituya Bay

Yakutat Bay

Malaspina Glacier

Mount St. Elias

Mount Logan

Mount McKinley

Mount Wrangell

Mount Sanford

Mount Bona

Mount Blackburn

Mount Drum

Mount Sanford

Mount Wrangell

Mount Bona

Mount Blackburn

Mount Drum

Mount McKinley

Mount Logan

Mount St. Elias

Yakutat Bay

Malaspina Glacier

Lituya Bay

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Icy Strait

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Kobuk River

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Alaskan Mountains

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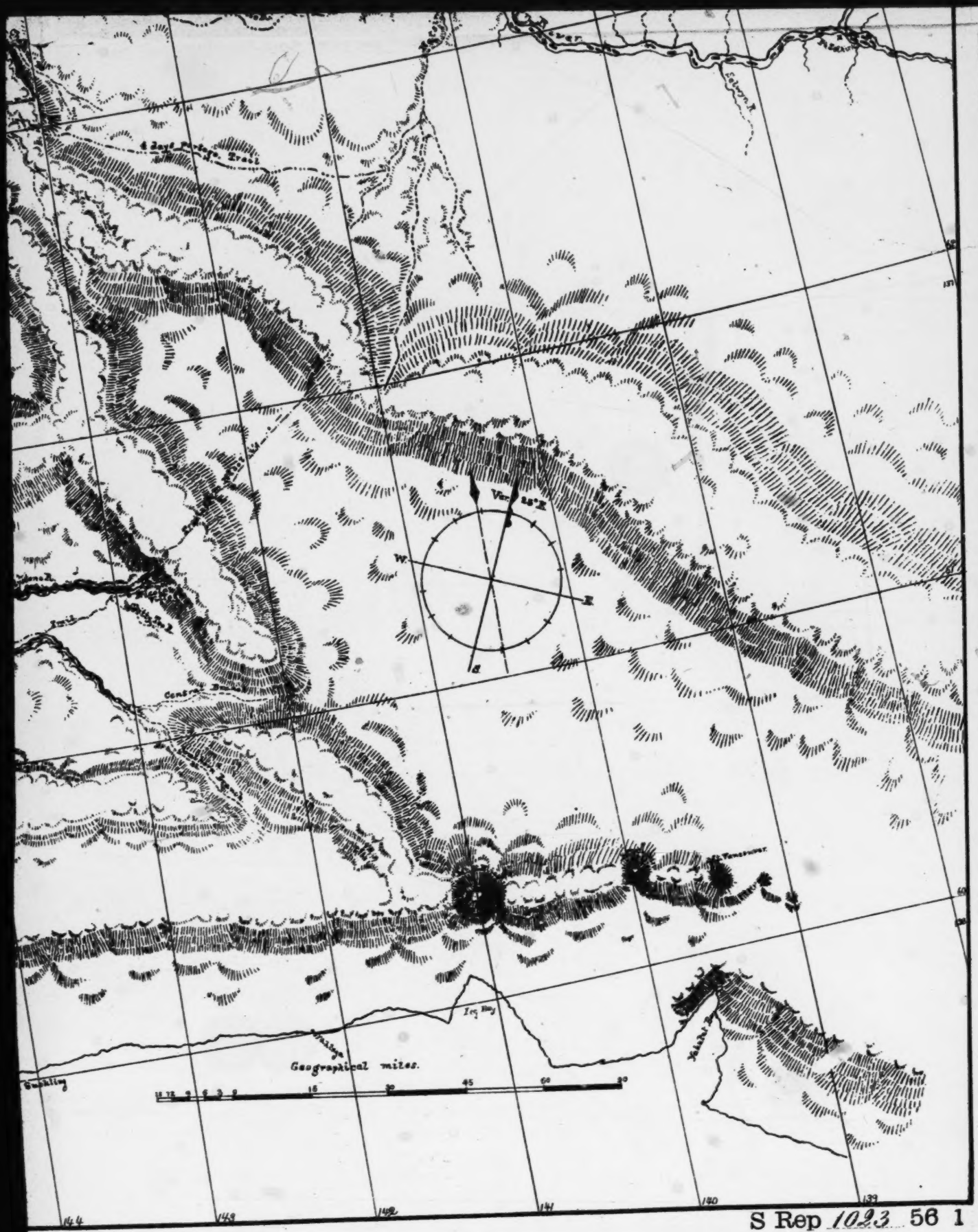
Var. 28°E
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Geographical miles.
144
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139

MILITARY RECONNOISSANCE IN ALASKA.

By Lieut. HENRY T. ALLEN, Second United States Cavalry.

INTRODUCTION.

Lieut. Henry T. Allen, when ordered by the Secretary of War, through the commanding officer of the Department of the Columbia, to proceed to make a reconnoissance of the Copper River and the Tanana River valleys, Alaska, was an officer of the Second United States Cavalry and aid-de-camp on the staff of the commanding general. Lieutenant Allen was appointed acting assistant quartermaster, acting commissary of subsistence, and acting ordnance officer of the expedition. His associates were Sergt. Cady Robertson, Troop E, Second United States Cavalry, and Private Fred. W. Fickett, United States Signal Corps.

His instructions were to proceed by a February steamer to Sitka, Alaska. Here he was ordered to engage passage by the steamer *Leo* or other conveyance to Nuchek, the nearest practical harbor, to the mouth of the Copper River. He was specially enjoined to make his researches thorough and endeavor to complete, as far as practicable, all desired information in each portion of the country traversed as he advanced into the interior, in order that his work might be resumed if deemed necessary at some future time, provided that by untoward circumstances he should be compelled to abandon the expedition. He was further instructed to reach the mouth of Copper River at least by March, so as to ascend the river on the ice. In all other things Lieutenant Allen was left to his own discretion and judgment. He was especially enjoined to exercise careful and strict economy in his expenditures.

It may be noted, by reference to Lieutenant Allen's maps, that the rivers and other geographical features actually seen are drawn in full. Previously unmapped information from other sources is indicated by dotted lines. The reduction of sextant observations, which depended on a best grade Howard movement watch, was not as satisfactory as he had hoped to obtain. Having had the benefit of a trip to Alaska before starting on this reconnoissance, he became convinced of the impracticability of carrying a box chronometer.

Lieutenant Allen renders a fit tribute to his assistants, Sergt. Cady Robertson and Private Fred. W. Fickett. The prospectors, Peter Johnson and John Bremner, whom he subsequently added to the party, also rendered most excellent service.

The photography of Copper River other than that obtained from Lieutenant Abercrombie expresses in a poor manner the result of much patience and perseverance under the most trying circumstances. The plates were necessarily intrusted to natives to be carried to the mouth of the river. Their curiosity led the Indians to open the box containing them, thus exposing the plates to the light and totally injuring all but a few that had been developed. The loss of the psychrometer by theft of the natives on the upper waters of the Tanana and the injury they inflicted on the aneroid barometer accounts for the absence of records from these instruments after the middle of June.

Much has been written with respect to the Alaskan country in general, its coast resources, peoples and their customs, but the following report is restricted almost entirely to the interior, and especially to the vast extent of country drained by the Copper, Tanana, and Koyukuk rivers, nearly all of which is unknown. To those unacquainted with the extent of our Alaskan possessions the distances recorded during the explorations would seem exaggerated. Observa-

tion of the accompanying map, showing the number of degrees of latitude and longitude covered by the exploration, and a recollection that the area of Alaska is equal to three times that of New England, New York, Pennsylvania, New Jersey, and Maryland taken together, will suffice to account for the seemingly excessive distances. The work is included between the sixtieth and sixty-seventh parallels and between the one hundred and forty-second and one hundred and sixty-first meridians, and these inclose approximately 240,000 square miles. It is a very remarkable fact that a region under a civilized government for more than a century should remain so completely unknown as the vast territory drained by the Copper, Tanana, and Koyukuk rivers.

COPPER RIVER.

The knowledge of Copper or Ætná River prior to 1884 was limited to Russian records and native reports.

The initial point for all expeditions to that river has been Port Eteches (Nuchek) or Hinchinbrook Island, now the trading station of the Alaska Commercial Company, and about 50 miles to the westward of the mouth of Copper River.

This village was located by Cook in 1776–1779; by Chornhoff in 1830; Belcher in 1836–1842; Tebénkoff in 1852; and, more recently, by the Coast and Geodetic Survey, which last gives it a latitude of 60° 21′ N. and longitude of 146° 38′ W.

From 1788, the year when the first redoubt (*odinátschka*) was built at the mouth of the river, up to 1847 the explorations were made by men wholly destitute of mathematical knowledge, and the maps constructed by them were subsequently found to be entirely inaccurate.

The odinátschka ("a single redoubt") was located a few miles south of Alagánik (Anahánuk), but at present no traces of it remain. It is probable that a village of two miserable barábarras, called by the natives "Skátalis," is on the site of the old odinátschka of the Russians.

The mouth of Copper River was discovered by Nagaieff in 1781.

In 1796 there were two expeditions having for their object the exploration of Copper River, one under Tarchánoff, the other under Samóyleff, both of which failed, the latter on account of hostility of the natives.

In 1798 Partíchken, and in 1803 Bóyanoff, explored the Copper River for a short distance. In 1819 Klimóosky made some explorations in the same direction. In 1843 Gregórieff (Grijorjew of the Germans) renewed the attempt.

In 1847 Captain Tebénkoff directed Rufus Seréberinikoff, a Creole[1] and a graduate of a school of commercial navigation of St. Petersburg, to explore the Copper River.

The unfortunate Seréberinikoff, with his assistants, eleven in number, a part at least of whom were Aleuts, were murdered somewhere north of the Tleschitina, a river known at the present time by the natives as Tazlena, and such I have called it in my report. The cause of his death and the spot where his remains rest are not definitely known, and the meager results of his explorations are only known from his partially destroyed notes, subsequently given up by the natives. It is true that one of his observations for latitude gave 62° 48′ N., but there is no record of his journey after he had descended the Tazlena and started again up the Copper. The mouth of the Tazlena is in approximate latitude 62° N.

On the 14th of August, 1847, Seréberinikoff arrived at Alaganik, on the most westerly channel of the delta of the Copper River, called by him Anee River. His observation placed this village in latitude 60° 41′ 17″, while the records show it to be only a few miles above the odinátschka. Lieutenant Abercrombie places it in latitude 60° 21′, and the latter has been used by me. Continuously cloudy and stormy weather prevented an observation in this locality during our travels.

The following is the gist of Seréberinikoff's notes. The Russian party left Alaganik,

[1] The term Creole, misapplied to mixed races of the Russian-American possessions, formerly signified the offspring of a Russian father and native mother. At the present time there are many so-called Creoles in Alaska, some of whom have a Russian grandfather and an American father. In many the native blood predominates. A former master of the schooner *Leo*, who had married a Creole of the Aleutian Islands, informed me that there were at that time (1884) only two "pure blood" Russian women in Alaska.

intending to row up the river, but meeting a current of 9 miles per hour, was compelled to cordell.

On the 18th the northernmost end of this channel (the Anee) was reached, some floating ice having been encountered en route. At the upper end of the channel were numerous shallows.

On August 26, eight days after reaching the main stream, the latitude was determined to be 60° 38′ 47″. I will here remark that this observation is probably the authority for the very singular position of the mouth of Copper River, as shown on all existing charts prior to that of Lieutenant Abercrombie. It is evident that either the observation is much out or else the delta mouth of the river has undergone a wonderful change since 1848. I found the course of the river from Alaganik by following the western channels as much as possible, to be nearly north. I do not doubt that radical changes are being wrought in the delta of the river by the enormous deposits annually carried down, but the one in question seems too great to have been accomplished in a period of thirty-seven years.

On September 1 Seréberinikoff's boat struck a hidden rock, and many valuable articles, including his watch, were lost.

September 4 his party reached the odinátschka, below the mouth of the Tschichitna (Chettyna), where it wintered. The coldest weather recorded was 40 below zero (Reamur).

May 16, 1848, Seréberinikoff started for the upper river with 11 men, 100 fish, 4 poods (36 pounds each) of biscuits, 4 wild sheep, and some tea and sugar.

At noon on the 17th the party passed the mouth of the Chettyna. On the 18th stopped at a settlement of twelve souls, where the inhabitants were suffering fearfully from destitution and hunger, and on the following day it arrived at a settlement of twelve souls, six women and six children, the five men usually dwelling there having gone to Constantine Redoubt (Nuchek). Here the party was treated to fish bones and some roots, and in return gave 2 pounds of tobacco.

On the 20th it reached a deserted settlement, whose inhabitants had left in March for a hunt.

On the 22d the sheep were all gone and the men put on one fish per day.

On the 24th reached mouth of Tazlena, flowing from Lake Plaveznie. Men put on one-half fish per day. The Tazlena was found to be shallow, full of stones, and very rapid.

On the 25th started on foot to explore Lake Pleveznie, keeping the Tazlena in sight.

On the 28th made a halt on a small river and met two families of natives returning from a hunt. Were treated to fresh moose meat, and gave them in turn 2 pounds of tobacco. Observation for latitude gave 62° 8′ 11″.

On the 30th reached the lake; found two families. At night the natives killed four deer (*caribou*), swimming in the lake. Purchased one for 135 feet of beads. All of it was at once eaten, together with some dry meat and some small fish. Red fish (salmon, doubtless) appear in the middle of June. It is said they never go down the river again. Natives of Plaveznie have the same language, same destitution, and constant suffering as do those of Copper River. Hunger begins the middle of winter, however abundant the game of the preceding season. The greatest reliance for food is on rabbits, which they snare.

June 3 built a baidárra and passed two days in following around the shores of the lake. The southeastern end of it is near a chain of mountains capped with ice, below the line of which timber grows. From the west side the lake receives two tributaries, along one of which is the portage to the Bay of Kenai, to make which requires about twelve days. Trees on southern shores only. Latitude of southerly point of lake is 62° 2′ 32″. Poverty of natives leads to the conclusion that there would be little fur trade.

June 5 took leave of the friendly natives and started down the Tazlena in a baidárra, reaching its mouth the following day. Thence up the Copper River. From this time there are no records, save the observation, which gives a latitude of 62° 48′ 45″.

I have had the above translated from the "Journal of the Russian Geographical Society," published at St. Petersburg in 1849, now in the Congressional Library, by Mr. S. N. Buynitzi, and have gone thus into detail to show that the nomadic habits of the natives, their improvidence, and the annual scarcity of food during the winter months existed forty years ago as well as to-day. The above narrative, so far as I know, is all that is of record relative to the Tazlena River

and Lake Pleveznie. It partially accounts for the origin of the Midnoóskies' present insatiate desire for tobacco. The watch having been lost early in September, 1847, there were no determinations of longitude.

From Nicolai, one of the most intelligent of the Midnoóskies (the name given to the Copper River natives by the Russians), I learned that there had been three massacres of Russians on the Copper River, one above Taral and two below. The one above, probably that of Sereberinikoff, he claims was done by the Tatlatáns, or Upper Copper River natives, the one near the mouth of the river by coast natives, and the one just below Tarál by his own people.

He was reluctant to talk about the matter, but finally vindicated his people by telling the wrongs inflicted on them by the Russians. His story was as follows: Three Russians and as many sleds drawn by natives were en route to Taral with merchandise. The natives were not allowed to sleep, and were compelled to haul the Russians, who slept on the sleds. At a preconcerted sign the head of each of them was crushed in with an ax. He said he knew nothing about the details of the other massacres, and if he did he would not talk about them.

The following is from the Alaska Coast Pilot, part 1, published in 1869:

> There is an Indian settlement at the mouth of the Tschettschitna (Chettyna), and when the ice breaks up in the lake the stream suddenly overflows its banks and rushes with such swiftness that the inhabitants flee to the mountains.
>
> On the left bank of the Ætna, a mile above the Tschettschitna, is the single house of one of the Russian company's traders. Tebénkoff places it in latitude 61° 28′ 01″ and longitude 145° 16′. On the left bank, directly in view of the post, is the sugar-loaf-shaped volcano, Mount Wrangell, covered with perpetual snow, but emitting fire and smoke. The natives of the river are described by Tebénkoff as savage, bloodthirsty, suspicious, stubborn, and unwilling to have anything to do with the Russians.

I saw no traces of this Indian settlement at the mouth of Tschettschitna (Chettyna), and if such existed it would probably have been situated on its banks, which are many feet higher than the line the water attained in the spring of 1885. Moreover, there is no lake of any considerable size at the head of the river, if the natives can in any manner be relied on. The only traces of a Russian store that I could ascertain to have ever existed are at the present village of Tarál, 2½ miles below the mouth of the Chettyna. I found Mount Wrangell to be on the east side of Copper River and 40 miles distant from the nearest point. Tebénkoff's information was derived from the data of Seréberinikoff, whom he sent out. I cite the above few extracts to show how the existing knowledge of the Copper River region differs from the country as we saw it.

The natives informed me that no white men had ever ascended the Chettyna River, and this is partially corroborated by the fact that in 1867 the officers of the Russian American Company supposed that pure copper was found in masses 25 or 30 miles above the mouth of the river.

In 1882 Mr. C. G. Holt, the present trader at Nuchek, ascended the Copper River with the Midnooskies as far as Taral, on their return to their own country, in the spring, and remained with them until September. He, however, returned to Nuchek without having been more than a mile or two from Taral. His objective point was the copper region of Chettyna; but having been crippled through some accident his purpose was defeated. He described the natives as treacherous and thievish, detailing at the same time some incidents from which he drew his estimate of their character, and illustrated the imminent dangers to which they had exposed him.[1]

In the summer of 1884 Lieut. W. R. Abercrombie, Second Infantry, A. D. C., assisted by Captain Robinson, assistant surgeon, Lieutenant Brumback, Second Infantry, and C. A. Homan, assistant topographer, started up the Copper River with instructions from Gen. N. A. Miles, commanding department, similar to those hereto prefixed. This party reached a position on the Copper River in latitude 60° 41′, when it returned to Nuchek, and subsequently made explorations in the direction of Port Valdez.

The miner, John Bremner, ascended the Copper as far as Taral in the summer of 1884, and his subsequent actions are included in my report.

So far as I know, the foregoing constituted our knowledge of the Copper River and its shed prior to 1885.

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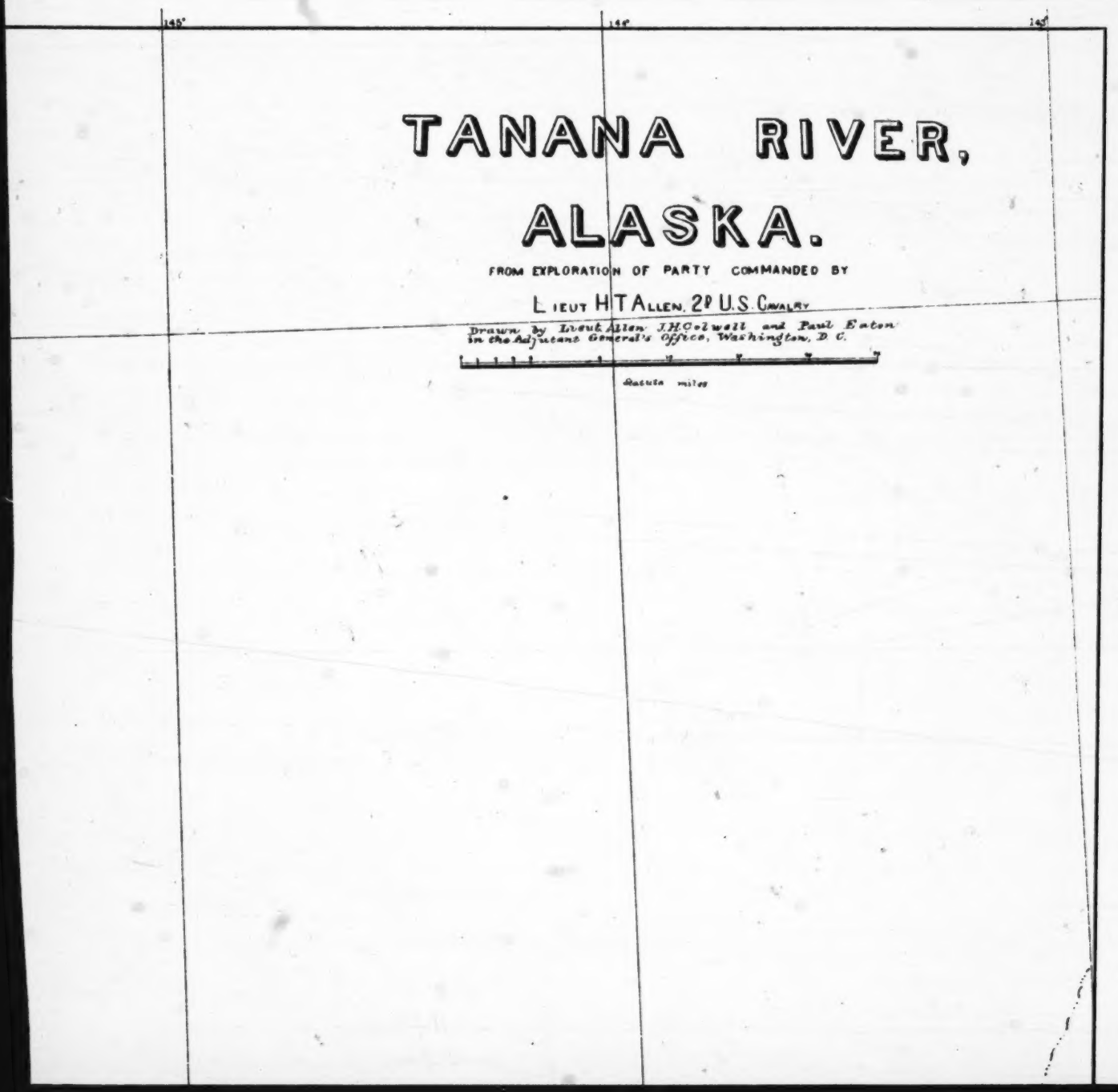
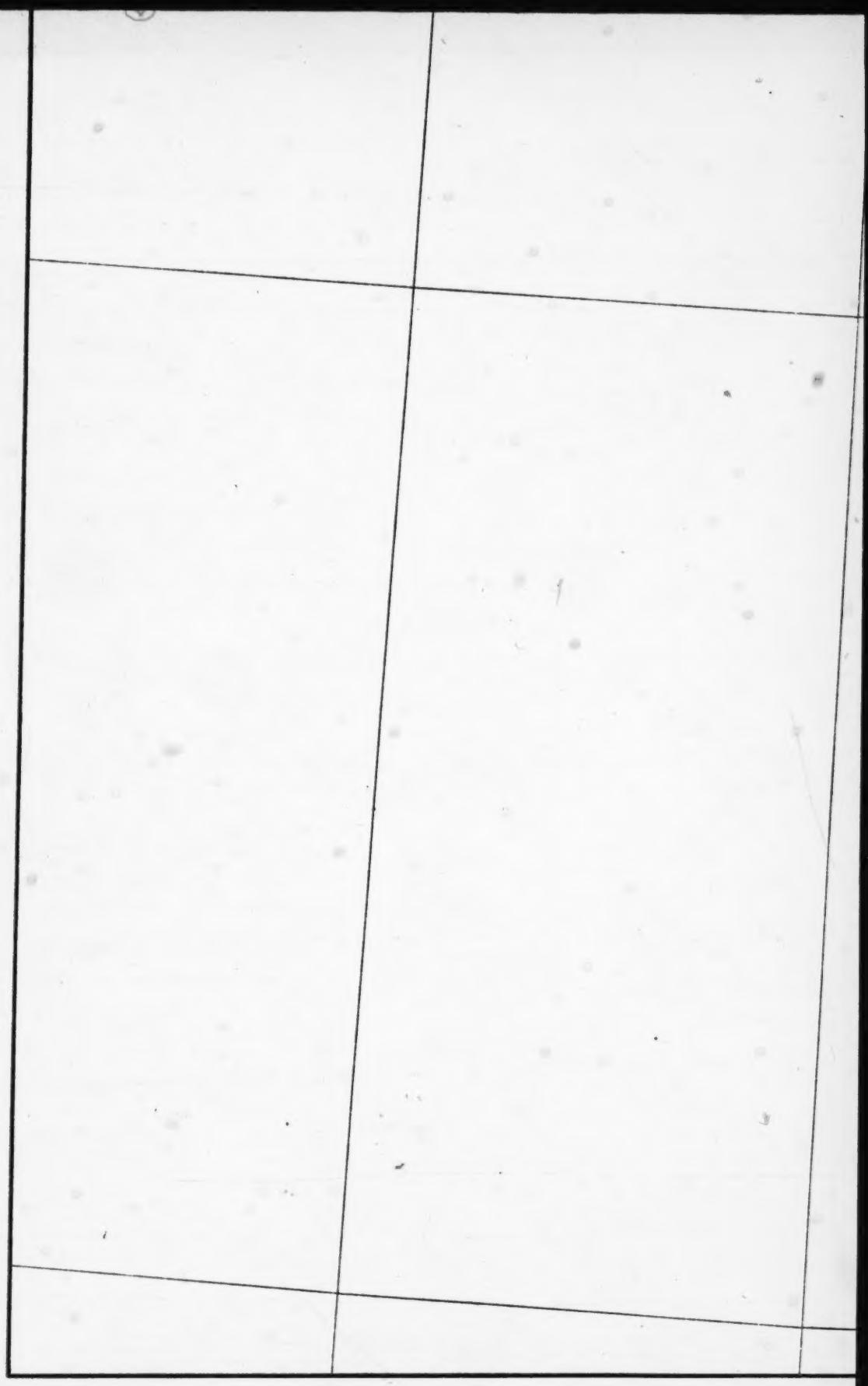
[1] About one year after our visit to Nuchek Mr. Holt was murdered by the Copper River natives, who seemed to cherish a violent dislike toward him during our intercourse with them.

146°
146° 6'
147°
147° 6'
65°
65°
TANANA RIVER
Hotes Rapids


145°
146°
147°
TANANA RIVER,
ALASKA.
FROM EXPLORATION OF PARTY COMMANDED BY
LIEUT H.T. ALLEN, 2D U.S. CAVALRY
Drawn by Lieut. Allen, J.H. Colwell and Paul Eaton
in the Adjutant General's Office, Washington, D.C.
Statute miles



TANANA RIVE

64° 65°

63° 63°

147°

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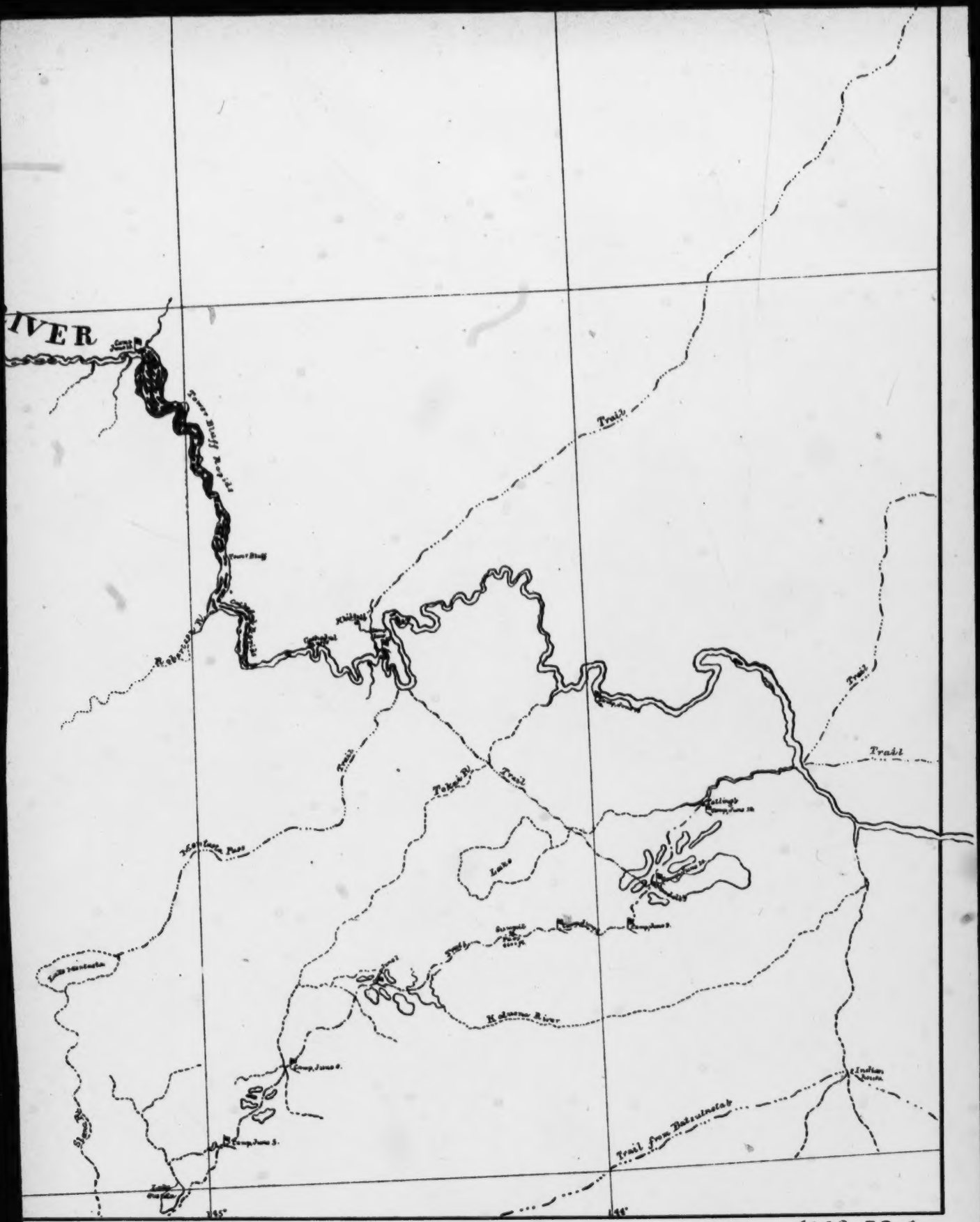
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TANANA RIVER.

The history of "white man's" exploits on the Tanana is indeed limited, and, by omitting one or two events, might be told in the history of the little trading station on the right bank, 48 miles from the mouth of the river.

From A Reconnoissance of the Yukon River, 1869, by Raymond, the following is taken:

Leaving Nulato on the 19th, we arrived at Fort Adams on the 22d. This station is near the mouth of the Tanana River, the most important tributary of the Yukon, and was at the time the easternmost station ever established on the river from the western coast. * * * Chief, indeed, among all the tributaries of the Yukon stands the great Tanana, "the River of the Mountains." It empties into the Yukon about 30 miles below the Ramparts, and its rapid waters increase the current of the main river for a long distance. Only a few miles from the mouth have been traveled by white men. It apparently comes from the southeast, but it is believed that many miles above the explored portion it makes a great bend from the east, its sources lying near the Upper Yukon.

The following account is from Alaska and its Resources, 1870, by Dall:

The Tanana River enters the Yukon in latitude 64° 07′ N. and longitude 150° 08′ W., and is entirely unexplored. No white man has dipped his paddle into its waters, and we only know of its length and character from Indian reports. They inform us that it flows from the eastward; that some of its head waters are not far from Fort Yukon and others not far distant from the Upper Ramparts of the Yukon, above the fort. The largest trees brought down in the spring freshets come from this river. Its banks are said to be high and mountainous and its course marked by rapids and cascades. The length is estimated at 250 miles. The name Tanana means River of Mountains, and it has long been described on the old maps of Russian America under the name of the River of the Mountain Men. The Hudson Bay men called it the Gens des Buttes River.

For a while after the transfer of the Territory there were two rival companies in the Yukon country, each eager to obtain the furs of the natives of the Tanana, and this led to the establishment of a post on the north bank of the Tanana, 48 miles above its mouth.

This is the station where Mrs. Bean, the wife of the trader, was murdered in cold blood. Her slayer is yet at large, and the indifference to his crime manifested by our Government now causes the natives to make threats to the white traders, at the same time boasting of the immunity accorded Mrs. Bean's murderer. They also cite the massacre of Lieutenant Barnard and the Russian Kogénikoff, for which they have never been punished.

In the year 1882 the missionary, Mr. Simms, started with a few natives up the Tanana in canoes. The distance he ascended is not known, though it is supposed that the Toclat River was the limit of his travel. His food supplies became short, and the Yukon natives, through fear of the Tananas, refused to go farther, hence his return.

I met while in the Territory several miners who had either started across from Fort Reliance for the Tanana or were going to start very soon. Up to the time I left that river none had ever reached its waters. The frequent visits of the Upper Tananas to the posts Fetutlin and Fort Reliance on the Yukon, called by them Tetatling and Sawchek, respectively, have awakened in many of the miners who annually cross from Chilcat to the Yukon a strong desire to visit the country of these people. It is not the difficulties of the trail so much as its length that has thus far deterred them. To carry supplies on the back for that distance and at the same time prospect is a difficult task even for miners, the most hardy and capable class of men for such work.

Lieutenant Schwatka, in his official report of his reconnoissance on the Yukon in 1883, makes mention of the Tanana as the largest unexplored river of the Western Continent. In his Along Alaska's Great River, published in 1885, an account of the journey from Fetutlin, near Johnny's Village, on the Yukon, to the Tanana, thence to its mouth, by Messrs. Harper and Bates, is given as follows:

With one white companion and some Indians as packers he crossed from the trading station at Belle Isle, near Johnny's Village, or Klatol-klin, in a southwest direction over the hills that divide the Yukon and Tanana basins, ascending a tributary of the former and descending one of the latter, the journey occupying two or three weeks, after which the Indians were sent back. A boat was constructed from the hide of a moose, resembling the "bull boat" of the Western frontiersman, and in this they drifted to the river's mouth. At the point the two travelers first sighted the Tanana the trader estimated it to be about 1,200 yards wide, or very nearly three-fourths of a mile, and as they were floating fifteen or sixteen hours a day for ten days on a current whose speed he estimated at 6 or 7

miles an hour, it being much swifter than the Yukon at any point as high as Belle Isle, my informant computed his progress at from 90 to 100 miles a day, or from 900 to 1,000 miles along the Tanana. He estimates the whole length of the river, by combining the result of his observation with Indian reports, at from 1,000 to 1,200 miles. Fear of the Tanana Indians appears to be the motive for the rapid rate of travel through their country, and although in general a very friendly tribe to encounter away from home, they are always opposed to any exploration of their country. The trader's companion had suggested and promoted the journey as a quasi-scientific expedition, and he collected a few skulls of the natives and some botanical specimens, but no maps or notes were made of the trip, and it was afterwards said by the Alaska Company's employees that the explorer was an envoy of the "opposition," as the old traders called the new company, sent to obtain information regarding the country as a trading district. Allowing a fair margin for all possible error, I think the river is from 800 to 900 miles long, not a single portion of which can be said to have been mapped. This would probably make the Tanana, if I am right in my estimate, the largest wholly unexplored river in the world, certainly the longest of the Western Continent.

Lieutenant Schwatka adds as a footnote:

I have since learned that Mr. Bates made a map and took notes.

I traveled several days on the Yukon River with Mr. Harper and learned of him that his party had no instruments for determining positions while running down the Tanana. From his description of that part of the river first seen by it, and being informed by him that it was below the Bushy-haired chief's (Kheeltat's), I am disposed to think that it was just below Cathedral Rapids, about 100 miles from the mouth of the Tetling River. Mr. Harper considered his natives skilled men for running rapids and expressed great surprise that we had safely run the rapids of the Tanana without native assistance. He considered the chances of a party successfully running the rapids of the Tanana in a skin boat about equal to those in floating down the Yukon on a raft with natives on each bank firing at it.

These few paragraphs constitute the history of the third or fourth river in size in Alaska. I am in doubt whether this or the Koyukuk contains the greater volume of water.

KOYUKUK RIVER.

In the early part of the year 1833 the island of St. Michael became known to Cook, and was called by him Cape Stephens. In the latter part of the same year Baron Wrangell, general manager of the Russian-American colonies, with the idea that communication between Bering Sea and Norton Sound could be established overland, sent Tebénkoff to the latter place. While there Tebénkoff founded a settlement on "Cape Stephens," and called it and the island St. Michael, the name now used. From this point the subsequent Russian exploring expeditions into the Yukon country toward the Yukon River started.

A Creole, Andrea Glásanoff, with four volunteers, was the first to make the portage from Norton Sound to the Yukon River, thence to the Kuskokwim, but his explorations did not extend farther up the Yukon than Anvik River.

In 1833 Lieutenant Rosenberg, I. R. N., was sent with a schooner to explore the mouths of the Yukon, called at the time the Kwikpak, but failed to do so on account of the shallow water there.

Five years later Málakoff, starting from St. Michael in the interest of the Russian-American Company, crossed from Kekigtowruk village to the Yukon and ascended it as far as the present site of Nulato, 24 miles below the mouth of the Koyukuk River, where he established a trading station. For want of provisions he was compelled to return temporarily to St. Michael, and while absent the natives burned the building he had constructed.

Besides these, Captain Kúprianoff, I. R. N., sent several expeditions prior to 1841 toward the Yukon, the main object of all being of commercial interest.

In 1841 Captain Etolin was directed to select a competent man for astronomical determination of places in the direction of Kotzebue Sound and in the interior. Lieutenant Zagóskin having been chosen for this work arrived at St. Michael July 10, 1842, with six volunteers from Sitka. August 1 he started up the coast to the mouth of the Unalaklik River, where he established a post of four men. Its object was to prevent the natives carrying their furs to those farther north, who traded them to the inhabitants (Chukchi) of the Asiatic side, and also to secure communication with the settlement which Málakoff had begun at Nulato. For reasons

159°
157°
KOYUKUK RIVER, ALASKA.
FROM EXPLORATIONS IN 1885, OF PARTY
COMMANDED BY
LIEUT H T ALLEN 2D U S CAVALRY
Drawn by Lieut Allen and Messrs J H Colwell and Paul Eaton, in the Adjt Genl's Office, Washington, D C
Statute miles

156°

155°

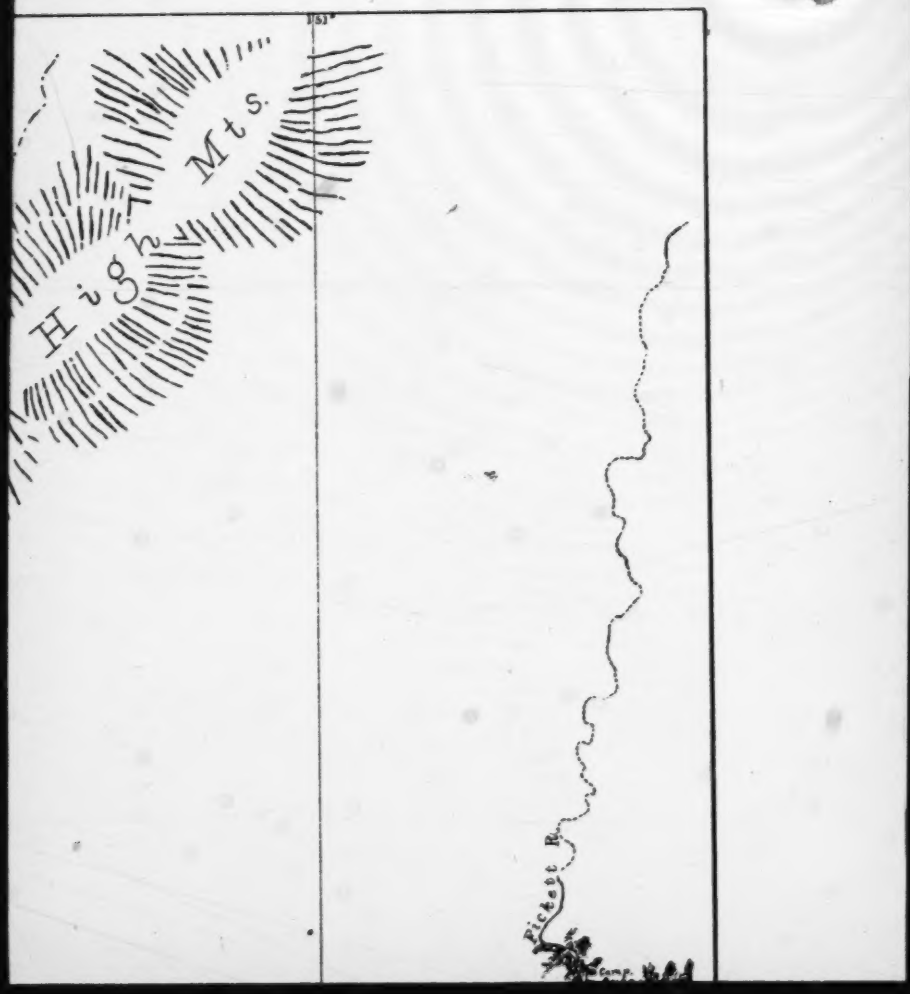
154°

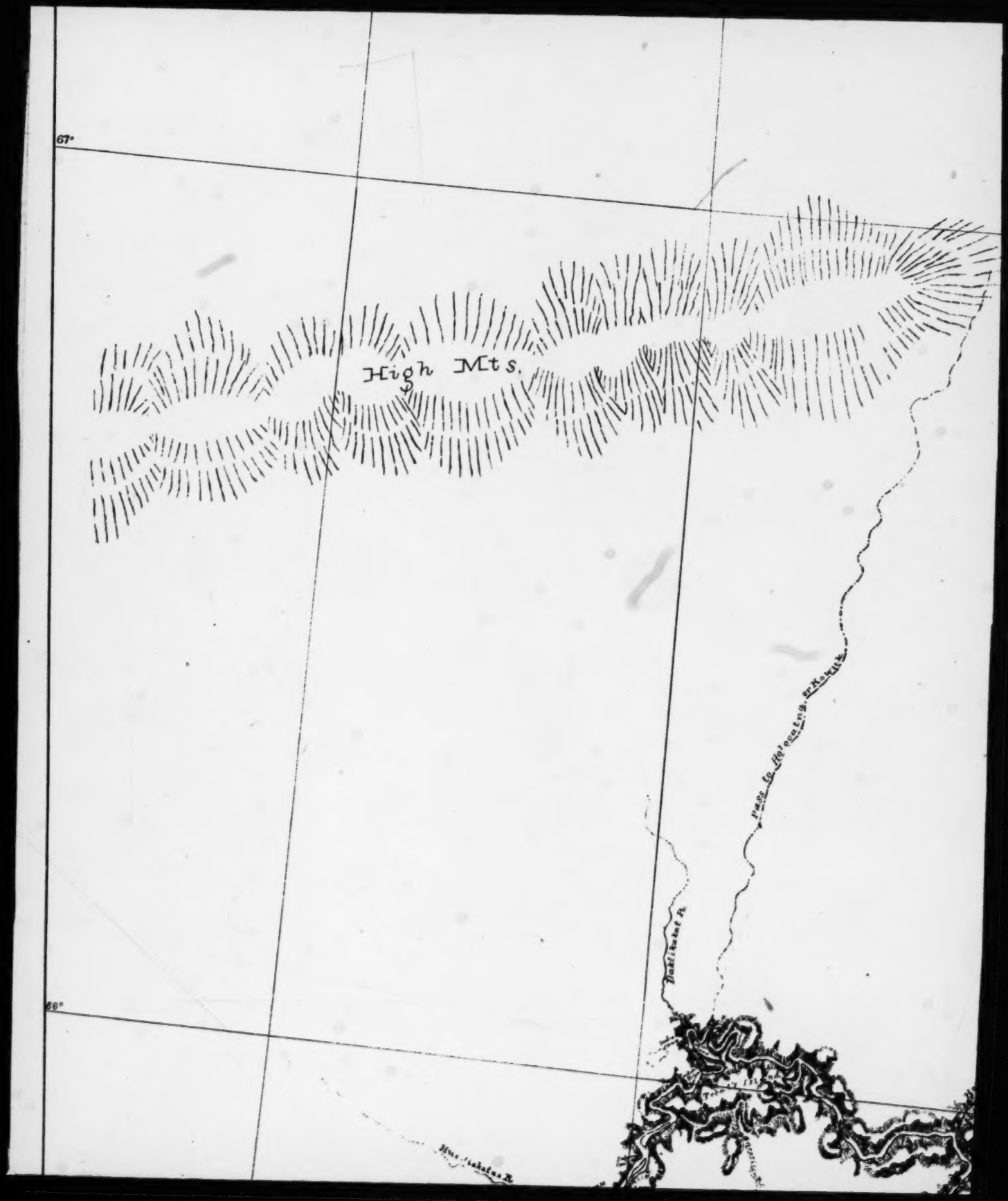
153°

152°

High Mts.

High


Mts.
Pictou R.


67°
High Mts.
68°

KOYUKUK RIVER

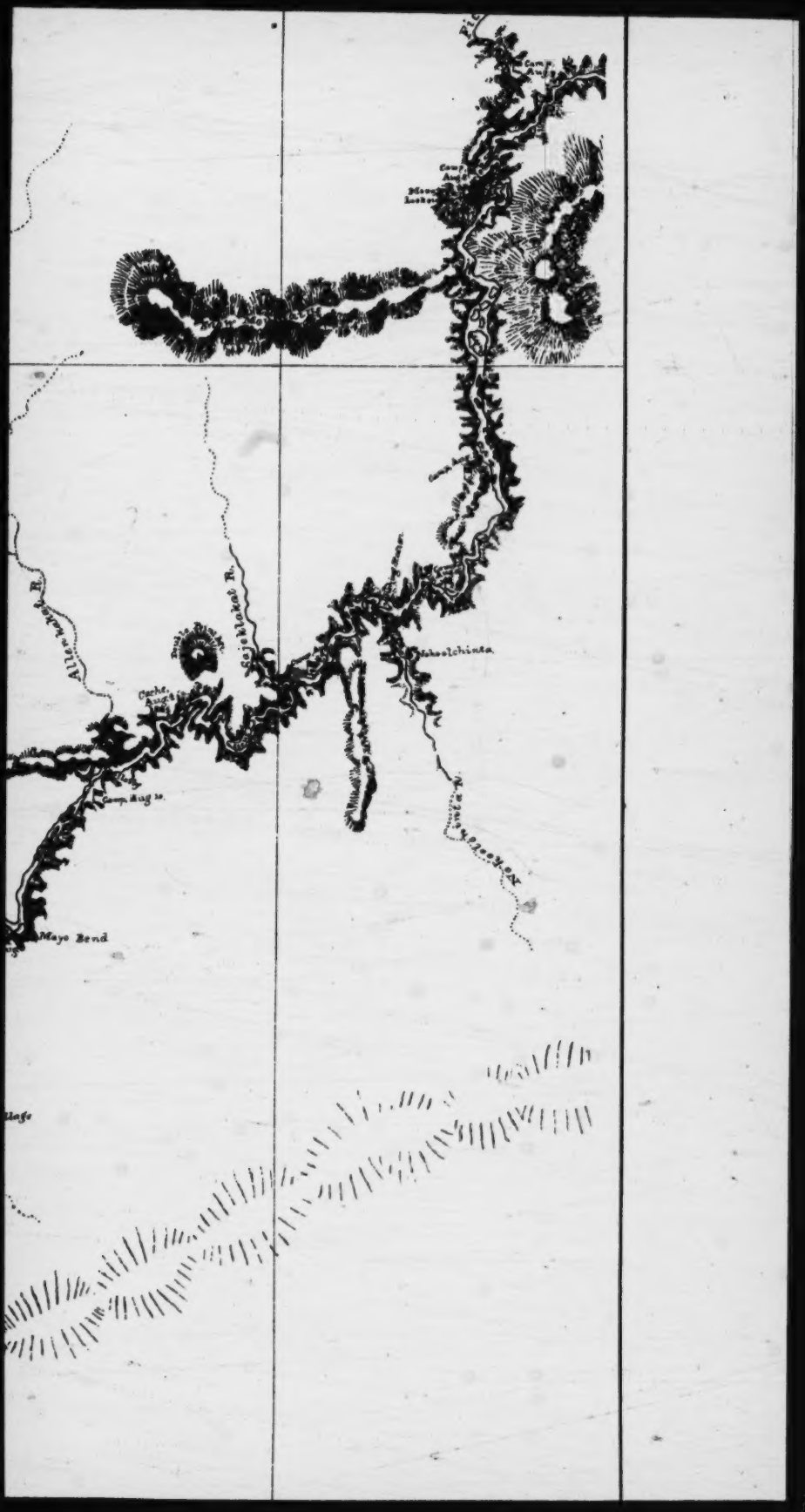
Alleviation R.

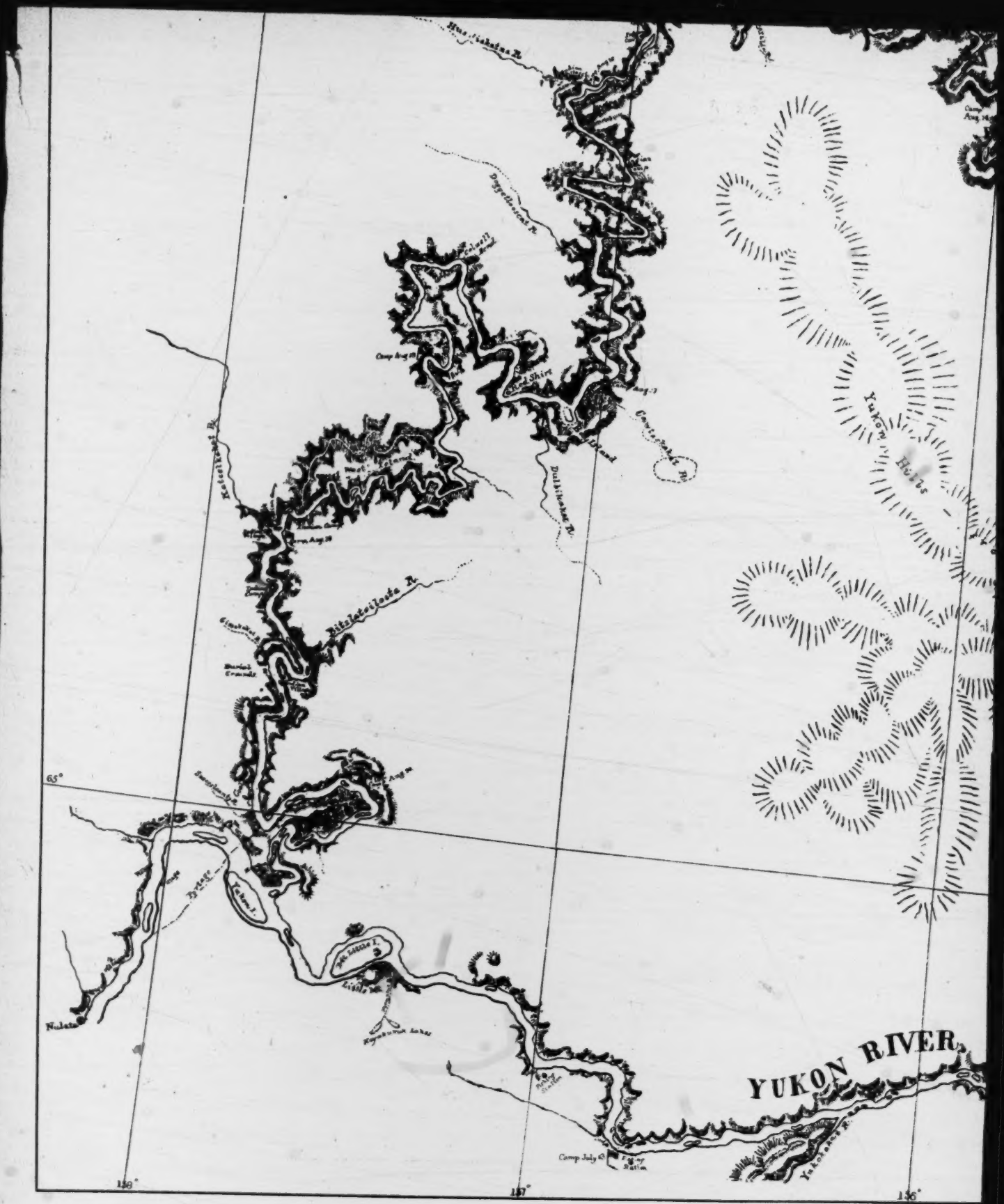
Alleviation R.

Red Mt.

Camp, Aug 11

Indian Village


Allen's Fork R.
Sojokokob R.
Maye Bend


YUKON RIVER
65°
138°
137°
136°

KOYUKUK RIVER

Bettsakakat R.

Camp, Aug 15.

Bettsakat

Bank Bluff

Melozikakat R.

2000 to 2500 feet in height

Melozikakat R.

Camp July 31

Trail to Tanikakat

July 31

Tanikakat River

YUKON RIVER

Camp July 28

Klatenakakat R.

Atatenakakakakat R.

Tatlanat R.

TANANA RIVER

ER

155°

154°

153°

152°

S Rep 1023 56 1

best known to himself. Zagóskin determined not to attempt the summer portage, but wait until winter; hence his return to St. Michael in the meantime.

On the 4th day of December, with 5 sleds and 27 dogs, he again started for Unalaklik, which he reached in time to start for the Yukon on the 16th. Heavy snows caused the failure of this attempt, but another on the 30th was successful, and on January 10, 1843, he was at a settlement on the Yukon (Hogotlinda), latitude 64° 19′. Five days later he was at Nulato, where he remained until February 25, when, in accordance with his instructions, he left the place to explore in the direction of Kotzebue Sound. To accomplish this he began the ascent of the Koyukuk River (Yunaka). At its junction with the Yukon he found a settlement of considerable size, called by the natives Tokakat.

March 4 he was at the junction of the Koteelkakat with the Koyukuk (56 miles by the river from the Yukon and his highest point on the Koyukuk). From this point he endeavored to reach an arm of Kotzebue Sound by following up the Koteelkakat, probably 30 or 40 miles, thence across the country to his destination. The natives he had employed, after having gone a great part of the distance, refused to advance farther through fear of the Mahlemutes, so Zagóskin was compelled to return via the Koyukuk without having accomplished all his mission. The highest point reached by him in the direction of the Koteelkakat is in latitude 65° 35′, about 20 miles north of its mouth.

The above is the gist of an abstract from Lieutenant Zagóskin's journal, by S. I. Zelónai, a member of St. Petersburg Geographical Society, afterwards minister of roads for Russia.

The following account of his explorations is given in the History of Alaska, by H. H. Bancroft, 1885:

> In 1842, Lieutenant Zagóskin, of the imperial navy, set forth for Norton Sound and Mikhillovsk (St. Michael) purposing to make an inland exploration of the northern territory. His work was confined chiefly to the middle course of the Kuskokwim and the lower course of the Yukon, especially the Koyukuk, which he followed to its headwaters, and to the divide which separates it from the streams running into Kotzebue Sound. At Nulato he was assisted by Derzhabin (Derabin?) in building a new fort. Zagóskin's exploration was performed conscientiously and well. Whenever we find mistakes we may ascribe them to his imperfect instruments and to local obstacles.

That Zagóskin went to the headwaters of the Koteelkakat I do not doubt, but I have failed to find any authority for the statement that he reached those of the Koyukuk.

Dall is the authority for the following, which is additional proof of the want of accurate knowledge of the size of the Koyukuk:

> The Koyukuk River enters from the north, and is a large stream, formed by the fusion of the Kuthlatino and Kutelno rivers from the west, and the Koteelkakat from the east. Its length, including tributaries, is estimated at 100 miles. Other rivers, rising near it, fall into Kotzebue and Norton sounds.

He too was probably, at the time of writing, under the impression that Zagóskin had reached its headwaters.

The officers and employees of the Western Union Telegraph expedition made many explorations in western Alaska shortly after the transfer of the Territory in 1868 (see Dall's works). Some of the American fur traders established a post at the junction of the Koteelkakat and Koyukuk to intercept the furs that would be delivered at Nulato. The competition that existed between rival trading companies caused the fur trade to become so unremunerative that finally the Alaska Commercial Company was left alone in charge of the business. The rivalry no longer existing, the post on the Koyukuk was abandoned and has so remained since.

The engineer of the steamboat *Yukon*, a Canadian, informed me that he had been to the Koyukuk in winter via the trail from Nuklukyet. I afterwards learned that not only he but Mr. Mayo, a fur trader, had been to the small village on the Konootena, a tributary of the Koyukuk, but no farther. It is hardly probable that any white man had, prior to our journey, seen that portion of the Koyukuk above the abandoned trading station.

Captain Raymond, as early as 1869, heard of the trail from near Nuklukyet (Fort Adams) to the Koyukuk. He describes from native reports as follows:

> From the headwaters of the Koteelkakat River, the eastern branch of the Koyukuk River, which empties into the Yukon a few miles above Nulato, the natives are said to make a portage to the headwaters of the Quisnon, and

descending this and the Tosecargut River, of which it is a western tributary, to make their way to Fort Adams. I have no information regarding the character of the country in the vicinity of these streams.

On the 13th we passed the mouth of the Koyukuk, the largest northern tributary of the Yukon River, I believe, although little or nothing is known any great distance beyond its mouth.

The "historical" of this river, so far as relates to the exploits of white men, is easily and quickly summed up. The study of the history of the natives, however, is highly interesting, but not by any means so determinate a one.

NARRATIVE.

The time of starting of the party was not definitely determined until a few hours prior to the departure of the mail steamer *Idaho*. She was boarded at Portland, Oreg., at 11 p. m., January 28, and departed for Puget Sound at daylight the following day. The first port touched was Townsend, at midnight, January 29. From this point the usual route was followed to Sitka, touching at the following places: Victoria and Nanaimo, on Vancouver Island, British Columbia; Wrangell, Juneau, and a few other places of less importance.

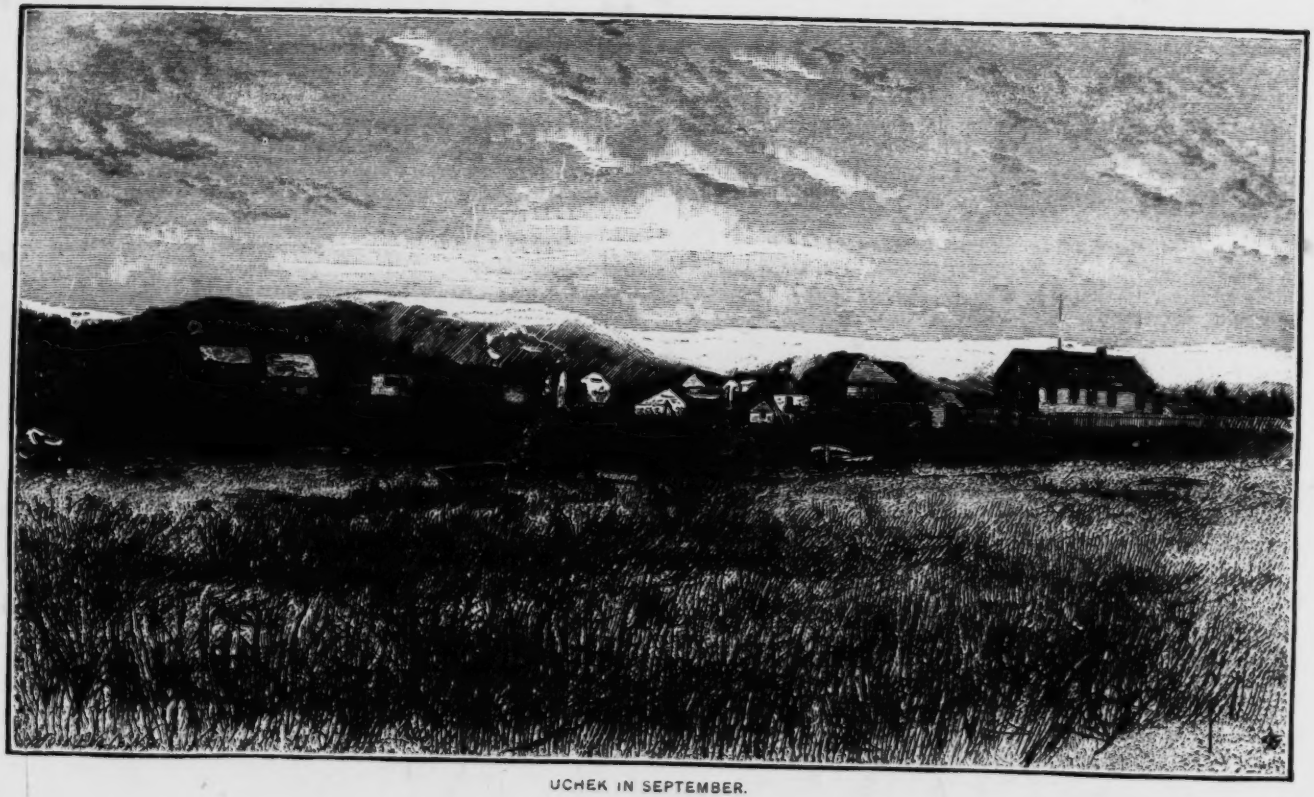
A few purchases of quartermaster and subsistence stores were made at Townsend and Victoria; also some sleds at Juneau, such as are used by the miners of the Stickeen River country. These sleds are described farther on.

We reached Sitka February 10, and found, much to my chagrin, that the schooner *Leo*, on which the transportation of party to Nuchek was contemplated, had sailed two days prior to San Francisco. That this disappointment was not the result of a breach of promise on the part of her owners did not mitigate in any degree our difficulties. Transportation on her was conditionally agreed upon between Mr. Whitford, of Sitka, and myself, a few months prior, with the understanding that I notify him by January steamer whether or not it would be wanted. At the very last moment I telegraphed to Nanaimo, British Columbia, the limit of telegraphic communication in the direction of Alaska: "There will be no Government party on February steamer;" and this released the schooner, since she failed to receive letters and telegrams addressed to her at San Francisco, where it is supposed she would be during December and part of January, instead of in Puget Sound, where I afterwards found she had stayed during this time. The telegram was carried from Nanaimo to Sitka by the January steamer, and expressed at the time the supposed intentions of the Government. The steamer that left Portland, Oreg., the last of December is called the January steamer, inasmuch as most of January is consumed in making both ways. At Townsend, on January 30, I learned that the *Leo* had cleared for Sitka, and this caused me to suppose that our arrival would find her there.

There is nothing not frequently previously described by others to be related of the passage of the mail steamer to Sitka.

The immediate point of departure for the interior of Alaska was Núchek, on Hinchinbrook Island, 432 miles distant by sea from Sitka and 50 miles from mouth of Copper River. It here seemed impossible to engage available transportation to either point. The *Idaho* would not consent to go, on account of it being the season of storms and the want of a sufficient supply of coal aboard. Lieutenant-Commander Nichols, United States Navy, would not move the *Pinta* without orders from the Navy Department. The Thlinkit Indians would not attempt the voyage at that season of the year in their canoes, though a few annually visit the Yakutat natives for trading purposes. These latter trade at Núchek, and through them transportation there was contemplated. An effort was finally made to secure a crew of white men, half-breeds, and natives with which to man an old row and sail boat of a peculiar type found at Sitka, and in this it was intended to follow the coast around to Núchek. The money offered these men was a great inducement, and all agreed at first, but finally refused, giving as their reason the danger of such an attempt. As a last resort I went to Kilisnoo on the *Idaho*, with a view of chartering the small steamboat used by the Northwest Fur and Trading Company at its fishery, but in this endeavor the same obstacles were met.

My efforts, together with other feasible methods, were recorded and sent on steamer *Idaho* to headquarters Department of the Columbia for consideration.



UCHEK IN SEPTEMBER.

From Kilisnoo I returned to Sitka (70 miles) by canoe, and remained until the return of the *Idaho*, March 11, 1885. In the meantime I continued to make preparations for the interior by overhauling and repacking the supplies, of which there were about 1,000 rations. At the same time we were familiarizing ourselves with our instruments, which were the sextant and artificial horizon, a best-grade watch of Howard movement, used as chronometer; camera, with dry plates and chemicals, and barometer. Besides these we had a pocket sextant, aneroid barometer, psychrometer, prismatic and pocket compasses. I found the pocket sextant to be unsatisfactory. The position of index arm, when it was supposed to be fixed, was unstable on account of the loose fittings of the gearings on which it depended. During this unexpected delay we added many articles that insufficient time below had prevented our collecting to our small outfit, yet was I by no means sanguine that all we already had could be carried. Among the valuable articles added were Liebig's extract of beef, other sleds, and sleeping bags of linen sailcloth, made thoroughly waterproof by the use of beeswax and linseed oil. To Lieut. T. Dix Bolles, executive officer of the *Pinta*, we were indebted for them.

The *Idaho*, on her arrival at Sitka, March 11, brought the authority given Lieutenant-Commander Nichols to convey my party to Nuchek, a copy of which I received. This long delay had, I was well aware, imperiled our prospects of ascending the Copper River on the ice. The *Pinta* loosed her moorings on the morning of the 13th, and left the dock on the 16th, bound for Núchek. This voyage was without special note, save the fogs we encountered near Middleton Island, which caused some delay.

On the afternoon of the 19th the *Pinta* steamed into Nuchek Harbor, to remain only a few hours. Our outfit, including provisions, having been carefully packed and reduced as much as possible in volume, was soon landed in the rowboats, the anchorage having been made off Phipps Point, about 1 mile from the landing.

The Department is already in possession of descriptions of the Indian village Nuchek, the natives, trading stores, and surroundings, from the report recently submitted by Lieut. W. R. Abercrombie, Second United States Infantry. This is the place visited by me in November, 1884, since which time the entire absence of change marks the truly conservative spirit of the village.

The only white man, the trader, Mr. Holt, informed me before landing that the Copper River natives had not yet been to the store to trade, but that they were in the Indian villages near the mouth of Copper River, and that he was daily expecting them. This seemed to partially prove that the ice had not yet gone out of the Copper River. The natives who had brought the report concerning Copper River natives (whom I will in the future call Midnóoskies, a Russian word meaning people of the Copper River) were not unanimous concerning the existence of ice in the Copper River. Some said that through fear of losing the ice upon which they traveled the Midnóoskies had returned without visiting Núchek; others that they had decided to wait until the ice went out and until a May trading party had come down the river in a baidárra (skin boat). Either one of these stories might have accounted for their delay in bringing over their furs, but neither was correct.

I will say in the beginning of this report that information from natives has generally proved about as accurate as the above. Their conclusions from concomitant circumstances are so much at variance with those naturally reached by an educated mind that no confidence can be placed in them. Information, while wholly false, may not be prompted by maliciousness, but frequently is the result of inability to make proper deductions. They tell most wonderful stories about parts of the country with which they are unacquainted, and doubtless believe very much of what they say. These characteristics were found to exist among all the natives of the interior as well as along the coast.

After landing at Núchek on the afternoon of March 19, immediate preparations were begun for departure the following morning. To get transportation to Alagánik was not an easy task. The season for hunting the sea otter was at hand, and the trader was making every effort to start the male population of the village on the hunt. Nearly all of these were accountable to the Alaska Commercial Company for liabilities incurred during the existence of the Northwest Fur

and Trading Company's station at Núchek. The accounts due the latter company had been transferred, and it was made incumbent on the present trader to collect them.

The natives, yet mindful of the Russian chastisements, obey through fear the present agent, who turns to advantage the presence of any vessel that is sighted or touches at Nuchek. The visit of the *Pinta*, fourth-rate man-of-war, with her small armament, though not seen by any natives above mouth of Copper River, was the indirect cause of much respect shown us by the natives. The farther we ascended the river the larger became this vessel and its guns. At one place its length, as estimated by a man, was equal to the distance between two islands, approximately half a mile, and the bore of the guns was expressed by the greatest partial inclosure formed by the arms, tips of fingers widely separated.

After much discussion we finally obtained two rowboats, each with capacity of about a ton, exclusive of the crews, and three natives, two of whom were boys, the third an old man, who was to act as pilot. None of these natives were fitted for sea-otter hunting, hence their transfer to us. Had the circumstances not required immediate action, I should have delayed in order to get thoroughly able-bodied men. Knowing how destructive a few warm days, even in that latitude, are to bodies of ice, I decided to accept that assistance that would give earliest action and a start. In this as in all subsequent transactions with Alaskan natives the difficulty of a start was present.

At this place I engaged the services of Peder Johnson, a prospector who had been employed by Lieutenant Abercrombie, and whose partner, John Bremner, had ascended the Copper River in a baidára with the Midnóoskies in July, 1884. He was expecting news from Bremner which would decide his movements, but not hearing anything, agreed to accompany us rather than to wait for the Midnóoskies to reach Nuchek.

NUCHEK TO ALAGANIK.

On the morning of March 20 we left Nuchek for the mouth of Copper River in the two boats obtained from the natives, with crews consisting of 4 white men and 3 natives.

The three Eyaks who had informed us that the Midnóoskies were at their village, and who were on a trading expedition, had promised us assistance, but deserted us just as we were starting. They helped us in launching the boats in the heavy surf that was rolling on the beach, and promised us to jump in at the proper time, two in one boat, one in the other, but they failed to do so without giving any reason. To have returned for reenforcement after the experiment we had had in launching would have been hardly advisable, inasmuch as breakers were rapidly increasing. The natives told us positively, as did the trader, that we could not launch our boats.

By the time we turned the southwest point of Hinchinbrook Island the breakers were washing our stores in the boats, and the natives insisted on returning to wait until the wind had subsided. The sun was yet shining, revealing with its splendor one of the finest water views along the coast, Prince Williams Sound, surrounded on all sides with snow-capped and glacier-bedecked mountains. The face of Hinchinbrook Island on the western side showed some remarkable folding of strata.

We continued our struggle. At 5 o'clock, having passed Johnstones Point, we went into camp on the north side of the island, in a long, narrow inlet, where we found two deserted barábarras. The old native selected this as a safe harbor, prophesying at the same time the near approach of a storm. The "old man's" prophecy was fulfilled, for barely had we hauled up the boats and made them fast than it began to sleet and rain, nor did we see the sun from that evening until we had passed the limit of great precipitation, north of the Copper River glaciers. The dimensions of the barábarras here were about 8 by 10 feet, and about 6½ feet high, built in the same manner as those at Nuchek.

The following day we left camp at 4 o'clock a. m. and passed through the narrow and shallow channel between Hawkins Island and the most northerly point of Hinchinbrook Island. From the southern extremity of Hawkins Island the storm forced us to direct our canoe to Point Whitshed, which should have been passed 2 miles to port. Here we went into a small cove on

west side of Point Whitshed, to interview an old native and his wife (Eyaks), whom we found by chance engaged in stringing clams. From them we learned that there was no other "harbor" for our boat short of the mouth of the Copper River, unless we ran up into the Eyak, several miles north of our direct course. They spoke much of the mud flats, which we afterwards became aquainted with through sad experience.

I relied much upon assistance from the Midnóoskies, whom the Eyaks said had been at their village, Eyak, and who had a letter from John Bremner at Tarál to Peder Johnson. Having worked continuously at the oars from 4 a. m. until 6 p. m., and being unwilling to pass the village of Eyak without information more definite than we could obtain from the two natives we had met, I decided to camp in the small cove.

Point Whitshed is a low, wooded peninsula, presenting a cragged appearance to the sea, and reaching within about 5 miles of Point Bentinck. This intermediate 5 miles has been described by Johnstone as "a low, uninterrupted, barren sand as far as the eye could reach." I did not find it to be such, but rather an extensive flat of bluish yellow mud, covered with water during the stormy days of our stay at flood tide; but at low tide no water, as far as the eye could reach, could be seen. These mud flats showed a network of tracks made by the small dugouts (canoes) used by the coast natives in their transportation. These draw only a few inches of water, and along the flats when the tide is low are propelled by using the paddle as a pole. From Point Whitshed, looking to the southward and eastward, a long line of piled ice and dwarf trees marked the channel of Eyak River, extending out into the flats.

To reach the principal channel of Copper River, which we were to ascend in order to obtain water to float our boats, necessitated a start from Point Whitshed at 3 in the morning, about the time of flood tide. The wind was dead ahead from the southeast, producing a heavy surf, and darkness was supreme. Our boats were constantly shipping water, yet for several hours we struggled against all difficulties, keeping close to the rugged and rocky shore without a beach. The more the tide fell the oftener we grounded on the mud. We had hoped to reach the channel of Copper River before this state of affairs could arrive. Finally, as a means of economy, we tried to make headway by going out from the shore, but the tide was receding too fast, and left us on the mud about 800 yards from shore. A few provisions were then carried by us to the rocky shore over the soft, sticky mud, and were cooked with driftwood found lodged among the rocks.

Taking Pete (Peder Johnson), I started afoot for Eyak village, and after four and a half hours of tiresome walking over mud, ice, and snow, and sometimes through water, found a settlement of five houses, the dwellings of eight men, situated on the east bank of Eyak River, about 1 mile below the lake source of the same, and 8 miles from the shore line of flood tide. Here we found the three Eyaks who had promised us assistance at Nuchek, and learned that two of the Midnóoskies (called by them "Kinái") had been to Eyak, but had gone back to Alaganik by the portage; also that there was a letter for Pete, but its location was unknown. The fact of a letter having been sent down the Copper River was so unusual as to be a "topic of conversation" among them. These Eyaks could give us no satisfactory account of the ice on Copper River, some declaring it good, others contradicting them. While returning to camp in a small canoe with four Eyaks we hailed, when about 1½ miles from the shore line and just out of the channel of Eyak River, a canoe with a small piece of cotton cloth for sail. They were hugging the shore as closely as the shallowness of the water would permit, on account of the storm. One of the natives was "Skilly," a Midnóoski, and the other "Kawkus," of Alaganik; the former, "captain" of the Copper River party, the latter the most prominent man of his village. They had the Copper River furs in charge, and were en route to Nuchek. Sighting their canoe seemed almost a godsend. They readily consented to sell their furs to me, and started for our boats, which we found could not he approached nearer than 200 or 300 yards, even in small canoes. We walked to the boats, thence to the shore, dragging our transportation over the soft mud, sinking in it in some places up to our knees.

Skilly promised (if we purchased his furs—$40 worth, Nuchek scale of prices) that he and three other Midnóoskies would give us assistance in our ascent of Copper River. He agreed to

carry these back to Alaganik and there turn them over. It was indeed consoling that these upper river natives had not returned to their homes.

Of our reenforcement from Eyak, only two could possibly leave their "duty" to help us, and with these we prepared to start off again at flood tide. After wading out to our stores, we found the afternoon tide not high enough to float the boats, so were compelled to pass the night ashore, and leave at 3 a. m. the following day, when, after struggling against the head wind for two or three hours without success, the intense darkness making matters worse, we turned back to the camp on west side of Point Whitshed rather than be again left stranded on the mud flats. We arrived at the twice-used camp, and remained until the flood morning tide, when we again started for the mouth of Copper River, which we fortunately reached before the tide could drop us on the mud. Had we been half an hour later the same fate as that of the preceding day awaited us. We could only know that we were in the channel of the river by the "windrow" of ice piled on its west bank. A divergence of a few yards either to right or left was sufficient to run the boats aground. As we ascended this western channel it became wider and the current stronger. The floating ice at times compelled us to entirely suspend rowing. We tried "cordelling," which was unsatisfactory on account of ice and numerous deep inlets along the banks.

About 7 p. m., after having rowed continuously for thirteen hours, we were stopped by an ice blockade. We had made our midday meal on hard bread in the boats. Had we been inclined to cook the absence of timber of any description would have prevented it. As we were entering the mouth of Copper River, natives from the hunt, who had heard of our plans, began to assemble. Some of these had been seen by us off Hawkins Island. In their small canoes they found no difficulty in reaching Sákhalis in advance of us. At the proper place they carried their canoes up the muddy banks to the marshy flats, partly covered with ice and snow, and then made their way by foot to Sákhalis.

Our immediate objective was Alagánik, further up, and our supplies were not then so scanty as those of the natives; hence our dependence, unlike theirs, was water transportation. After reaching the blockade the stores were unloaded and piled on the muddy bank, with nothing to protect them from the mud and rain except the three tent poles and the tent fly. We had been exposed to the storm for four days; our clothes were completely saturated; some of us, too, had been in the water up to our necks, and here we were entirely without firewood.

Under the guidance of the "Old Man" and the Eyaks we started afoot for Sákhalis over this flat, barren of everything except swamp grass and a wonderful mixture of ice, snow, mud, and water, made worse by the continuous rain and sleet of the past four days. Darkness was on us, and our little party of nine divided into three to try and find this village. After two hours' wandering it was found in a small "patch" of undergrowth, and consisted of two so-called houses, very small and equally crowded. These were each about 12 by 13 feet, and in the one where I slept were 29 natives, 10 dogs, and the household effects. The "Old Man" and one native strayed and were compelled to weather the storm without fire or shelter.

Here I was delighted to find two Midnóoskies, whom I employed, with all other available hands, to assist in transporting the supplies to Alagánik. The following morning great difficulty was experienced in getting the natives to leave the fire. On account of the packed ice our boats could be of no further service to us, and likewise the natives from Nuchek, who by this time were completely exhausted. The "Old Man" and his companion, that had strayed, appeared about 10 o'clock in the morning, just able to stand. We had not expected to see them again. We had employed them to go as far as Alagánik, but being by this time entirely useless, they were dismissed.

The stores were carried along the bank of the stream as far as a large slough from the west would permit and deposited in the mud, to be yet further damaged by the incessant, business-like rain. Some of the natives carried their packs about one-third the distance to the slough, deposited them, and returned to Sákhalis without even the ceremony of leave-taking. I gave up all hopes of getting the stores to Alagánik this day, so went thither (in a canoe which luck had seemed to place in our way) with Pete as interpreter. Before starting I had exacted a promise

START FROM ALAGÁNIK.

from the remaining natives to return on the morrow and give us assistance to Alagánik. I declined, contrary to their expectations, to reward them for their services until they had completed the task. We reached Alagánik at dark, and found Kawkus and Skilly, who seemed wholly unable to appreciate our hurry; nor could they give us any information concerning the condition of the ice on the river above. At this point there was no ice, but I attributed it to the effect of the tide, which was appreciable. At this village were only five men, all of whom I engaged, and started down the river in canoes the following morning to the stores. Between the point of first landing of stores and the slough were two ice gorges, so that the first "deposit" required another portage before it could be placed in canoes. Of course, those at the slough had also to be carried quite a distance. By using all the available natives of the two villages, and by the diligent work of my party, the stores were finally landed at Alagánik on March 27.

Since the evening of departure from Nuchek, March 20, we had been continually exposed to sleet and rain, driven by strong southeast wind, which rendered the limbs numb and action at times almost impossible. On one occasion each of the party tried to light a match, but all failed on account of numbness and moisture. These days were severe ones, but an excellent discipline for the even more trying work that was soon to follow.

Though nearly all the inhabitants of Sákhalis had moved up to Alagánik, only six men were then available for our purposes. These promised one hour to go, the next refused all connection with the expedition. In order to persuade them that it was a great privilege I was extending, I decided to take only five, and had them draw lots to determine the one that was to remain. This had the desired effect, though I would gladly have employed ten instead of five.

The Midnóoskies, four men and a woman, Skilly's following then at Alagánik, were also unwilling to start in the rain. Several times they promised to move, but when the time fixed arrived they had numerous excuses to explain their unwillingness to go on. The Midnóoskies told me at the last minute that they were not going back until the trading party of May arrived from above. All agreed that there was no ice in the river anywhere, and that the small canoes were unfit for its ascent. This was extremely exasperating.

Lieutenant Abercrombie says of the coast people: "These natives are inveterate liars, and were they not cowards we would stand a very indifferent prospect of exploring the country with their aid to any extent."

On the morning of the 28th, with a native, I went 4 miles up the river in a canoe, when we met a man returning, who informed us that he had been up many miles, and that there was no ice.

ALAGÁNIK TO TARÁL.

After returning, I decided to make a start in canoes, carrying sleds which could be used if ice were found. Private Fickett was to be left behind with most of the stores, with orders to join us at Tarál in May or June, when the Copper River natives would be returning. Two Midnóoskies were induced to help us. On the morning of the 29th, the party, consisting of 3 white men, Sergeant Robertson, Peder Johnson, and myself, 5 coast natives, and 2 Midnóoskies, started in 5 canoes, carrying 2 men and about 200 pounds of provisions and baggage each. With this last were sleds and snowshoes.

After an ascent of 6 miles up the river, north-northeast, the channel became too shallow for navigation, and a portage was necessitated. This brought us to another channel, partly covered with ice, and here the sleds were first used. Two canoes were carried across the portage and utilized on the water on top of the ice. There was very little snow at this point, so that we were able to carry large loads on the sleds. Sergeant Robertson was sent back for other sleds and more flour. Pete was finally sent back for Fickett, with instructions to bring forward all the provisions possible. At first this method of transportation seemed very favorable, but the continued increase of depth of soft snow made progress very difficult. Fickett left Alagánik with Pete and one Indian, in the afternoon, but did not reach camp until daylight the following morning. On his sled were about 450 pounds of supplies, with which they struggled to camp. The rains had made the snow so soft that most of the time the top strips of the sleds were on the snow, and at times sleds and provisions were below the surface. Our transportation now

consisted of six sleds, three similar to those used by the miners of the Stickeen River, one a native sled, and two made by cutting a canoe in two parts and then sloping off the tops from bow and stern respectively, thus making a kind of toboggan. It was soon evident that the greatest amount the best sleds would carry and make headway was 150 pounds. Even with this they would break through the soft snow.

On the morning of the 30th of March we abandoned about one-half of our ammunition, cooking outfit, food, clothing, etc. A few hours later we abandoned our tent and more clothing and food, and then had with us about 150 pounds of flour, 100 pounds of beans, 40 pounds of rice, 2 sides of bacon, 15 pounds of tea, some Liebig's extract of beef, deviled ham, and chocolate. The three Midnóoskies who had remained at Alagánik now joined us, but could give very little assistance on account of their own loads. A pack of 50 pounds on the back was, under the circumstances, as much as the strongest man could carry. In consequence of the water flowing over the ice, it became necessary to frequently cross from one side of the river to the opposite bank and to go from one channel to another. On two occasions we were compelled to improvise a bridge of drift timber to cross some of the channels, and frequently all our stores were dragged through water up to our hips. Our camps, without tentage of any description save our ponchos, on such snow as then existed, with an incessant precipitation of rain or sleet driven by a strong wind, for discomfort beggars description. It was impossible to dry our clothes, a fact that one and all soon recognized, and while we hugged the fire closely, it was principally to fry a piece of bacon or bake a "flapjack" (griddlecake), operations in which we all took part. As soon as the meal was completed each sought his blankets and in a few minutes was fast asleep, though bedding and clothes were saturated.

On the night of the 31st of March we camped on the east bank of the east channel, opposite a point midway between two glaciers, one of which the natives say unites with the northern extremity of Sheridans Glacier; the other, they say, heads near Eyak Lake. The most northerly of these two was called Goodmans Glacier by Lieutenant Abercrombie (to whom I am indebted for photography of Copper River below canyon of his name), and is only 3 or 4 miles below the southern point of Childs Glacier.

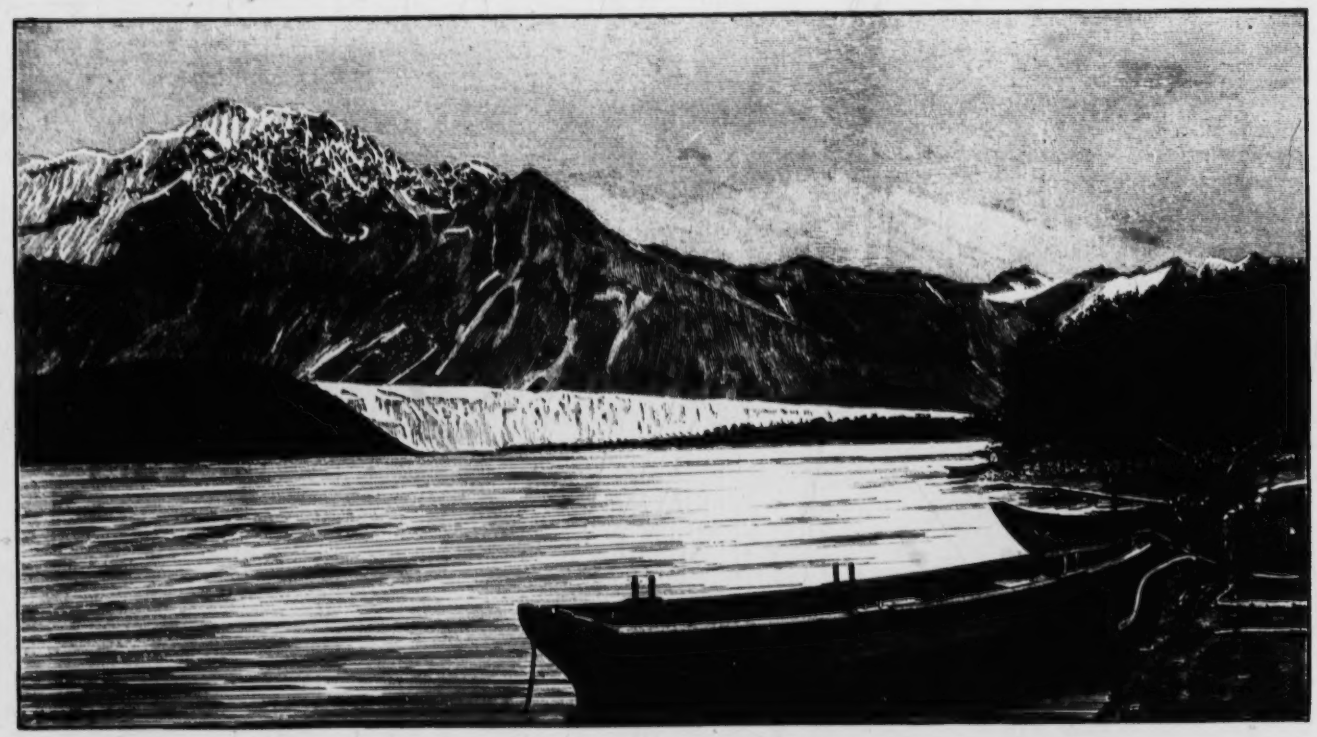
Lieutenant Abercrombie's description of Copper River, as seen in July at this place, is as follows:

> Crossed the river and commenced the ascent of the mountain range on our left flank, which is from 2,500 to 3,000 feet in altitude. In the afternoon we came to a perpendicular wall, which forbade further ascent, but we had gained a sufficient altitude to see, far to the northeast, a high wall of ice, visible as far back as the eye (aided with a field glass) could see. To the north, and almost joining the glacier on the northeast, we saw another monster moving off to the northeast. In our front, or east, lay a collection of thousands of small islands, covered as before described, varying from one-sixteenth of an acre to 50 acres in size, surrounded by a light-gray liquid, varying in breadth from a mile to a small stream, and in depth being about 3 feet here and about 18 inches farther down. This was Copper River, that we thought might be ascended in a steamer for 50 or 100 miles!

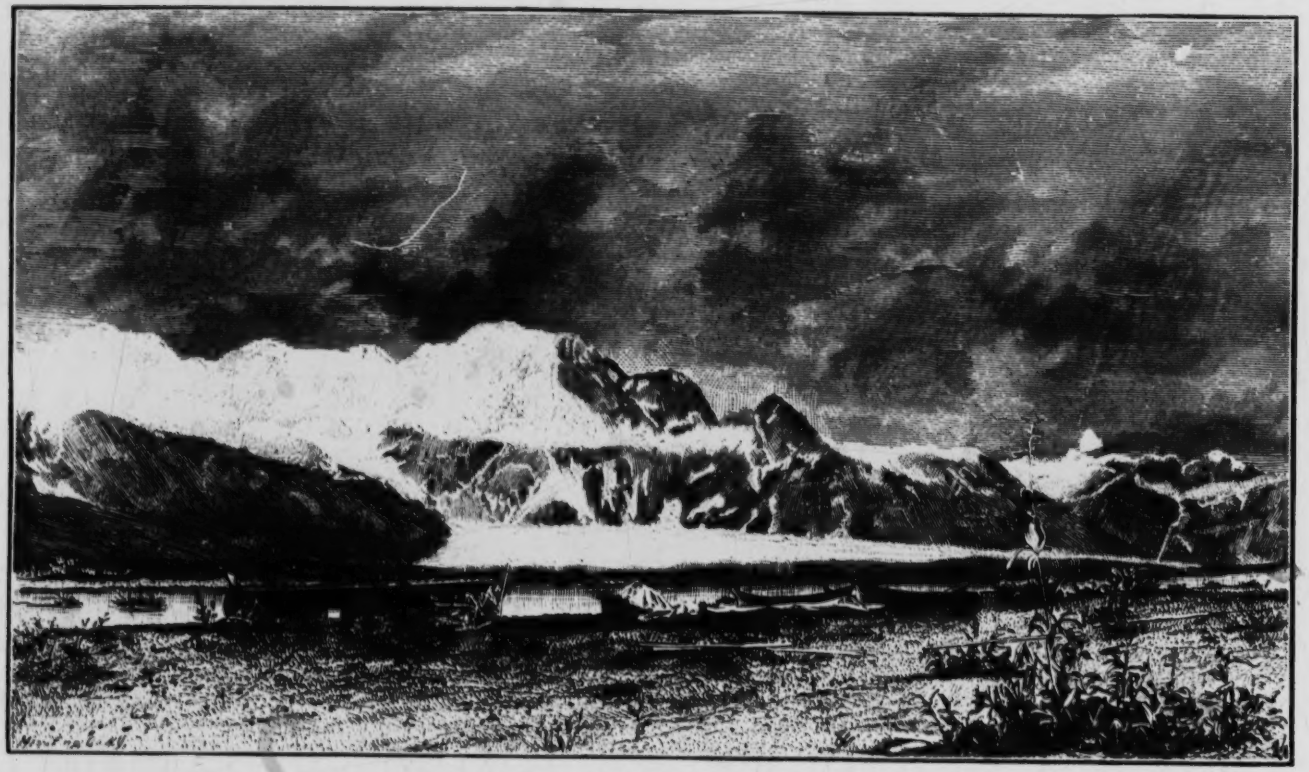
On the morning of April 1 we left camp with the storm more severe than ever, the precipitation having changed to snow. Remarks about the day of the month, surroundings, and ourselves were in order. After crossing the river twice, we began the portage over the huge deposit directly opposite Childs Glacier, the condition of the ice in front of this forbidding an attempt along the river. This deposit was considerably elevated above the river bed, and overgrown with small timber, which was so thick as to be a great impediment to the movement of our sleds.

Childs Glacier marks the first point in the ascent of Copper River at which only a single channel exists. From this point down the river varies in width from half a mile to 15 between extreme channels. On my map I have, as far up as the glaciers, largely followed Lieutenant Abercrombie, but to claim that this delta mouth is accurately mapped would be a great assumption.

At Childs Glacier the river has a decided easterly course to Miles Glacier, which is just north of the "portage deposit," and from it resumes its northerly course. The river between Childs Glacier and this deposit is about 125 yards in width, but just north of this and west of Miles Glacier the bed is approximately 800 yards wide, with several channels studded with huge, well-worn bowlders or slickensides.



NORTHERN PART OF CHILDS GLACIER.



SOUTHERN PART OF CHILDS GLACIER.

On the night of April 2 we went into camp on an enormous pile of immense rocks, heaped up in the center of the river bed. On the east side of these was a very small and narrow channel; on the west the width does not exceed 50 yards; and this is Copper River. Its depth must be great, though the ice forbade our march over it and consequently any attempt to determine it. I have called this remarkable gorge Abercrombies Canyon. A few miles below this place Lieutenant Abercrombie describes the river as follows:

> The river here narrows down to 150 yards from edge to edge of water, the difference in summer and fall being 20 yards. The spring rise is more than 40 feet, and the current runs from 10 to 15 miles an hour in the center of the stream at high water. This unusual rate causes a swash that throws the water up the rocky bank 10 or 15 feet, and the receding water carries every comparatively light obstacle, that is, bowlders weighing 700 or 800 pounds, back into the river.

The season of the year prevented our seeing such phenomena, though the swiftness of the running current was attested by the jamming and piling of ice 3 to 4 feet in thickness, the river above being yet closed.

Every morning before leaving camp I had the same scene with the natives, who were loath to leave their "forms," and protested that we could not go farther. On the morning of the 3d day of April, after a terrible night, so reluctant were they to leave that I was compelled to pull down the small pieces of shelter they had erected and drag each one from his resting place onto the snow.

Our only fuel at the "rocky camp" was a very limited amount of driftwood. No place in it could be found which would permit us to lie at full length, so our night was passed on our haunches, in a severe storm of snow and rain. At this time we had not learned to sleep "doubled up," as do the natives, and if we had the storm would have prevented it. The result was a night of watching and longing for day, with clothes as thoroughly saturated as though we had slept in the river. The coast natives had, of course, suffered with the rest of us, and were for some time disposed to go south to their friends, rather than north among people whom they feared. We were expecting to find plenty of food—they knew better—at Tarál. Finally, all were started over the mass of huge rocks, covered with snow, most miserable for sleds, and worse for the motive power drawing them. At times it became necessary to take off the snowshoes; then the probability of going down between large rocks every few steps could be readily determined. After an hour or two of this kind of work it was found necessary to make a portage of 400 yards along the west side of the rocks, next to the main channel, after which we again began sledding, and were soon without Abercrombie Canyon, and to our great delight the weather was partly clear. All were encouraged and worked with renewed zeal.

For the first 4 miles the course was due east, next 2 east-northeast, next northeast, and we were at a second canyon or narrows, called by me Baird Canyon, in honor of Prof. S. F. Baird, of the Smithsonian Institution. We camped at this canyon on west side of river, near a pile of driftwood, on snow 4 feet deep. At sunset a heavy snowstorm set in, which by morning had completely covered us. From this time forward our sleeping bags, of linen, made waterproof, were very useful. Their length was 6½ feet, and their circumference sufficient not to cramp the arms and body. There were holes at the top for the introduction of a gathering string. For use the blankets were adjusted in the bags, then the feet were inserted between the proper folds, and the body shoved in. Generally a poncho was pulled over the head of the "bed" in place of closing the bag. The 4th of April was the first day that we caught a glimpse of the sun from the time of our departure from Nuchek, March 20, and the first day or night that was free from a precipitation in some form.

The glaciers mark the change of climate between coast and interior. We hailed the sun with joy, not alone on account of personal comfort, but through a desire to secure observations for position. The camp at Baird Canyon was at the foot of a vegetation-covered glacier which extended along the river for 6 or 7 miles. A short distance above the canyon the width of the river is 2 miles, with two small streams emptying into it on the east side. This widened part, or lake, extends about 6 miles. Twelve miles above Abercrombie Canyon we obtained our first observations for latitude. At the "lake" the river has a width of about 1,000 yards, with high mountains on each side, and here the glacier system is practically passed. At the head, on the

east bank, is a very prominent rocky point, which seems, when viewed from the south, to jut out into the river, but which really helps to inclose the lakelike river.

We now found the snow firmer than any we had passed, and early in the morning, while the freezing of the previous night still had its effect, would support the weight of the sleds. The snow on the river along the lake was 4½ feet deep. In order to make the most of this good snow we did not halt to cook a midday meal where we could have obtained some small green wood, but continued our journey, satisfying the appetite with some beans boiled the night before. Hoping to find wood, we marched until 10 p. m., by which time it had become very cold, and our snowshoes were rendered worse than useless. The sun during the day had melted the snow considerably, and as it began to freeze again it would clog on the snowshoes. All efforts to prevent this, by continually striking them on the sides with a stick carried for that purpose, failed. Without the snowshoes every few steps would send us into the snow up to our hips. Some of the sleds did not reach camp until midnight, and so exhausted were the men drawing them that they were compelled to lie outstretched on the snow several times within a few hundred yards of camp.

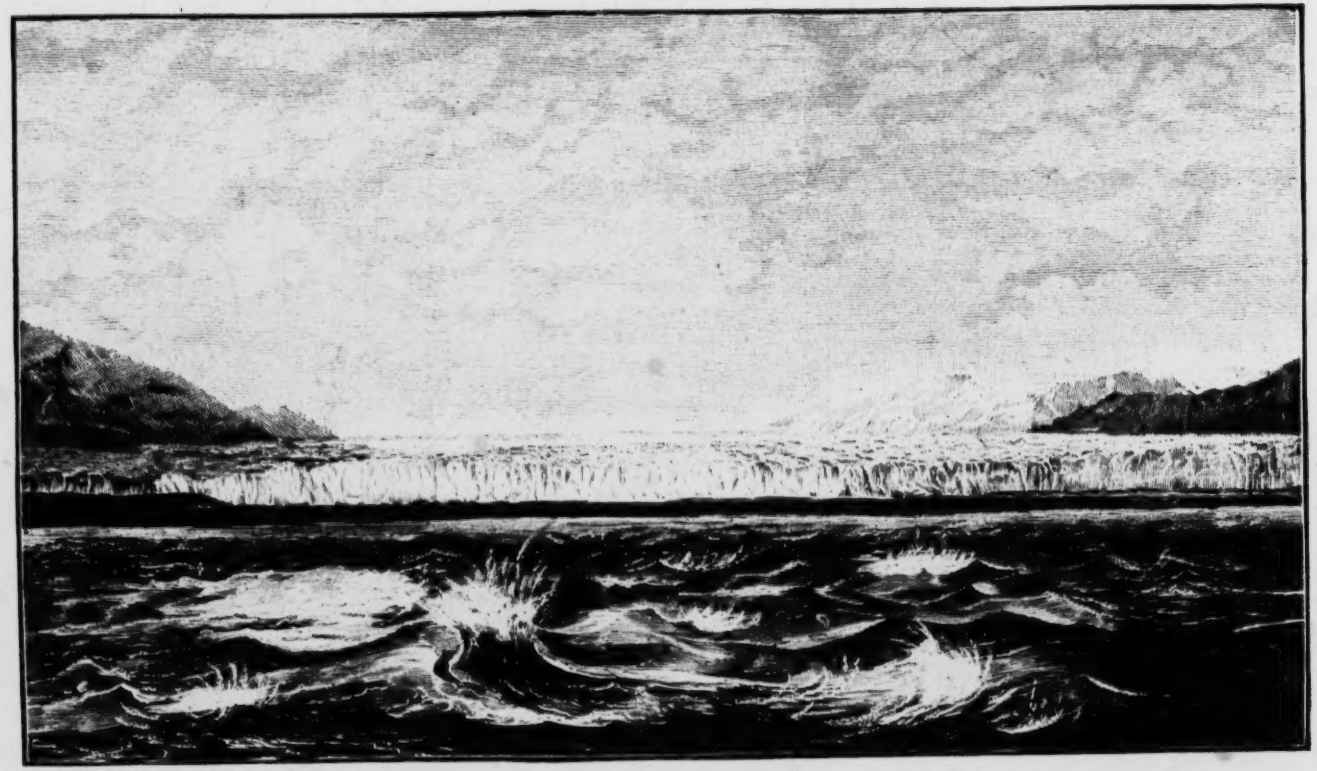
Our labors, so severe thus far, were barely begun; yet at this time I felt the greatest satisfaction in knowing that the doubt of reaching Taral by snow was eliminated. Had the party been delayed a week longer there would have been no possibility of seeing Taral until after the ice had gone out, and in such an event the party would probably have been compelled to pass the winter of 1885–86 in the interior of Alaska. Two days, or even one night, might have sufficed to put the river in such a state as to have caused this delay. As it was, we were compelled to bridge channels to cross them, and at one of these places one of my natives barely escaped by being fortunate enough to grasp the edge of the ice as he was being washed down.

Unable to obtain wood, we were compelled to exist on a half meal of beans from 6 a. m. of the 4th until 10 a. m. of the 5th. We had halted but six hours during that time. Exhaustion was preying severely on the party when we stopped to take a meal just north of the Tetahena, a stream of considerable importance entering the river on the east, 14 miles north of Bairds Canyon. The Midnoóskies had informed us that this river broke earlier than the Copper, and that we would probably not be able to pass it. The Tasnuna flows in from the west side, about 3 miles to the north, and is much smaller, though the appearance from the south does not indicate it. The Copper River, near the junction, is 1½ or 2 miles wide.

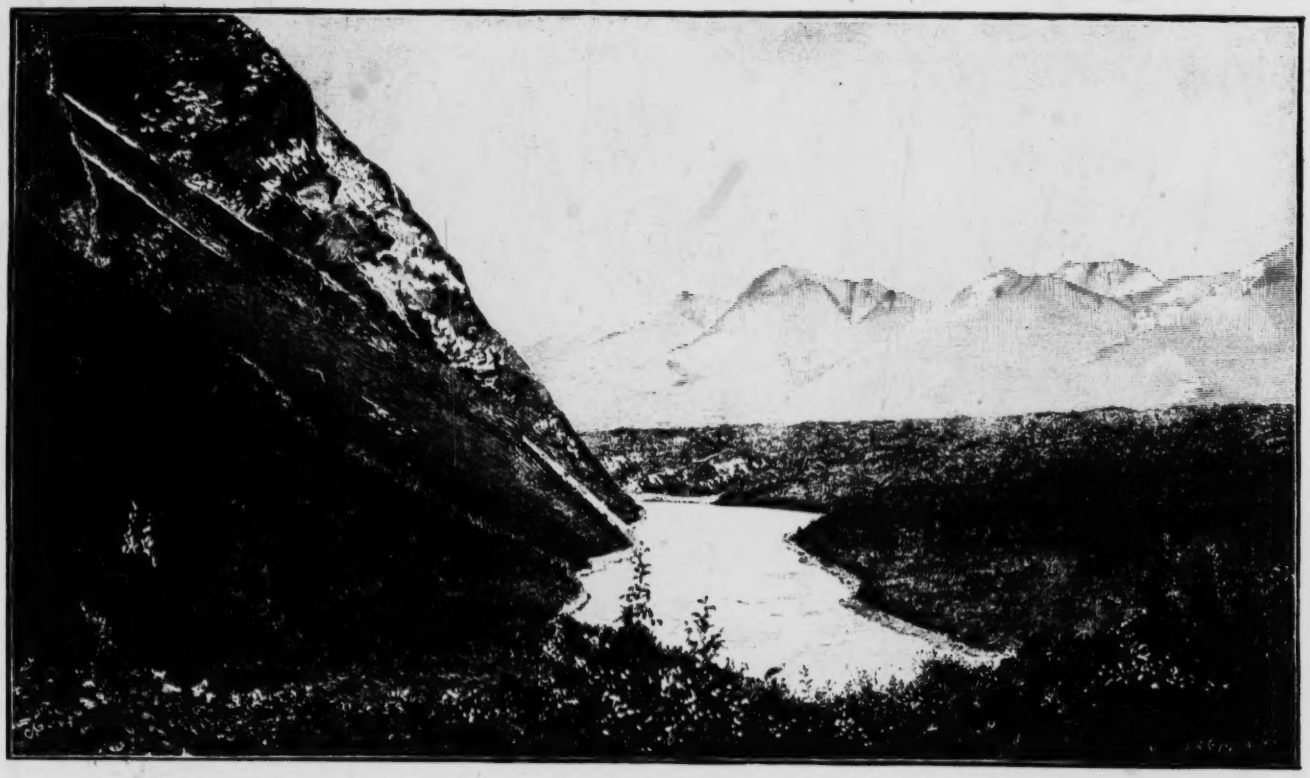
On the ice of the Copper River, opposite the mouth of the Tetahena, was water covered with ice about 1 inch thick. The Midnoóskies would not give us assistance over this, or even wait to show us the route they had taken. With the aid of a long stick we would punch through the thin ice to find the shallowest water, following the navigable channels as determined by this novel "lead-line." Some places, where the old ice was far below the new, were passed on hands and knees. With the stick we found that the Tetahena had several channels at its mouth, some of which were entirely open in the center. The only point at which to pass it was several hundred yards from the land, for the nearer the shore the more open was the Tetahena. The passing of it was very risky.

Having thoroughly satisfied our enforced hunger, and jubilant at having passed the Tetahena, all left the midday halting place in joyful spirits. Freezing had made the snow and ice splendid, and for one and a half hours there was a running struggle to keep the lead. Occasionally the winning sled would go through the new ice, and the next, by making a detour, would take the lead. Sometimes ice that would permit rapid crossing broke when a passage was leisurely attempted.

After sunset we came to a grove of cottonwoods, which at the time seemed to end Copper River, but which afterwards was found to be on an old island heavily covered with timber and snow to a depth of 4 feet. At Cottonwood Camp we passed the night, wondering what had become of Copper River. To the west of this island there appeared to be a very small channel, and to the east one very much smaller than the Copper River should be. After leaving camp the following morning and marching 4 miles, we came out of the woods and sighted Tasnuna River to the west of an island about 3 miles long and 800 feet wide, which we had supposed to be



MILES GLACIER.



ABERCROMBIE CANYON.

the mainland, and between which and our camp was the above-mentioned small channel. West of this island is probably the principal channel of Copper River, which was pointed out to us as the Tasnuna River when we were south of Cottonwood Camp. The place of our camp was doubtless part of the same large island.

At this time the eyes of the party, with the exception of Fickett's and the Midnoóskies, were a source of serious trouble, the coast natives suffering worst. The eyes of the Midnoóskies were as clear and free from inflammation as on the day of the start from Alaganik. Several times I was compelled to bathe the eyes of the coast natives with warm water and apply some ointment before they could be opened after a night's sleep. Sometimes they were so much swollen that opening was impossible; at such times their owners must work behind the sleds. A free application of tea proved very beneficial. It is a rather remarkable fact that the coast natives should suffer more than the whites of the party. None of the former were exempt, while one of the latter was.

In hauling the sleds one man usually preceded and pulled by means of a long string or rope, fastened to the end of each runner, and then passed over his breast, while the second man followed pushing with a long stick. The rear man could steady the sled or right it when upset. Sledding even under favorable circumstances is not such smooth work as is generally believed.

For several miles above and below Cottonwood Island the river bed varies from 1 to 2 miles in width. Six miles above it a small river, with a glacier source, called Kotsena, enters from the west side. Fifteen miles from the southern end of Cottonwood Island the mountains again attain considerable height. The highest peak here was called by the natives Nikneh. Six miles farther on we halted for the night on a sand spit, near the mouth of a small stream, called by the natives Tiekell. The general course of the river was, thus far, north.

On April 7 the course from the Tiekell to a very high mountain, "Spirit Mountain," on the east bank, a distance of 14 miles, was as follows: 4 miles north-northeast; 5 miles east-northeast; 4 miles north-northeast. Near the end of the first course were four islands, varying in height and size, the largest having a length of about a mile and a height of 50 feet. These islands have been named in honor of Seréberinikoff, the unfortunate Creole who lost his life at the hands of the inhabitants after having ascended the Copper River farther than any other man not native. These islands presented to us splendid examples of stratifications, the beginning of extensive faces of slate schist which characterize the river farther on.

All the party now began to realize how difficult it was to make headway and at the same time hunt for food; hence each one strove to husband the small quantity of such that remained. At this time we made the first attempt at eating the entrails of an animal—a porcupine. They were not relished then as they were at a later stage. At the porcupine feast of the morning the coast natives took occasion to smear their faces with charcoal and ashes, a thing that attracted little notice at the time, and was not explained until we went into camp at the foot of Spirit Mountain. This was the highest mountain yet seen by us (2,900 feet above river bed), and we supposed it to be Mount Wrangell. The coast people had some remarkable superstitions concerning it. Kawkus, the oldest of the coast natives, informed us that formerly much fire and smoke were emitted from the mountain, and that now terrific rumblings were at times heard, all the workings of a Mighty Spirit. Great alarm was manifested at every sound proceeding from that direction, and they were many, the result of snow slides. The following morning they were very loath to leave camp in the storm, which they attributed to the wrath of the "Mighty Spirit," notwithstanding we had been exposed to similar ones almost from the time we left Nuchek. The eyes of nearly all were now the source of serious pain, and, singularly enough, more painful during a snowstorm than when the sun was shining.

After the natives had again besmeared their faces we left camp, hoping to reach Taral during the day; but after traveling until quite dark, went into camp at the northern end of Woods Canyon, so called in honor of Col. H. Clay Wood, U. S. A.

The course during the day varied between northeast by north and north-northeast, and the distance traveled was 13 miles.

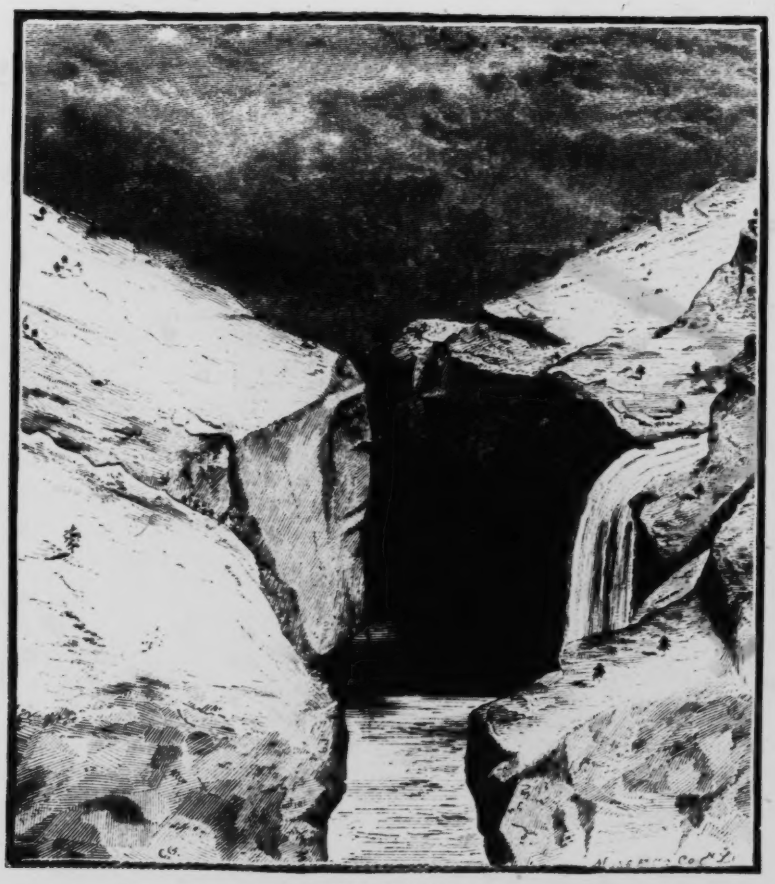
Near the middle of the march the river commenced to grow narrower, until one of the most

picturesque pieces of landscape I have ever seen—Wood Canyon—was reached. This is about 2½ miles long, with vertical walls of basalt and slate from 100 to 500 feet high. Above the limit of the vertical wall the mountains tower yet higher. In places the river does not exceed 40 yards in width, and so zigzag is the canyon that in several of the chambers it is difficult to tell the course of the river or to see more than a few rods to the rear or forward. In the largest chamber the greatest breadth is about 70 yards; on the east face was an ice river 100 feet high, 30 feet wide, and so natural in appearance that it seemed to have flowed at one grand burst from the rugged gorge above. When in this vicinity the only exit at first glance seems to be in the direction of the ice river.

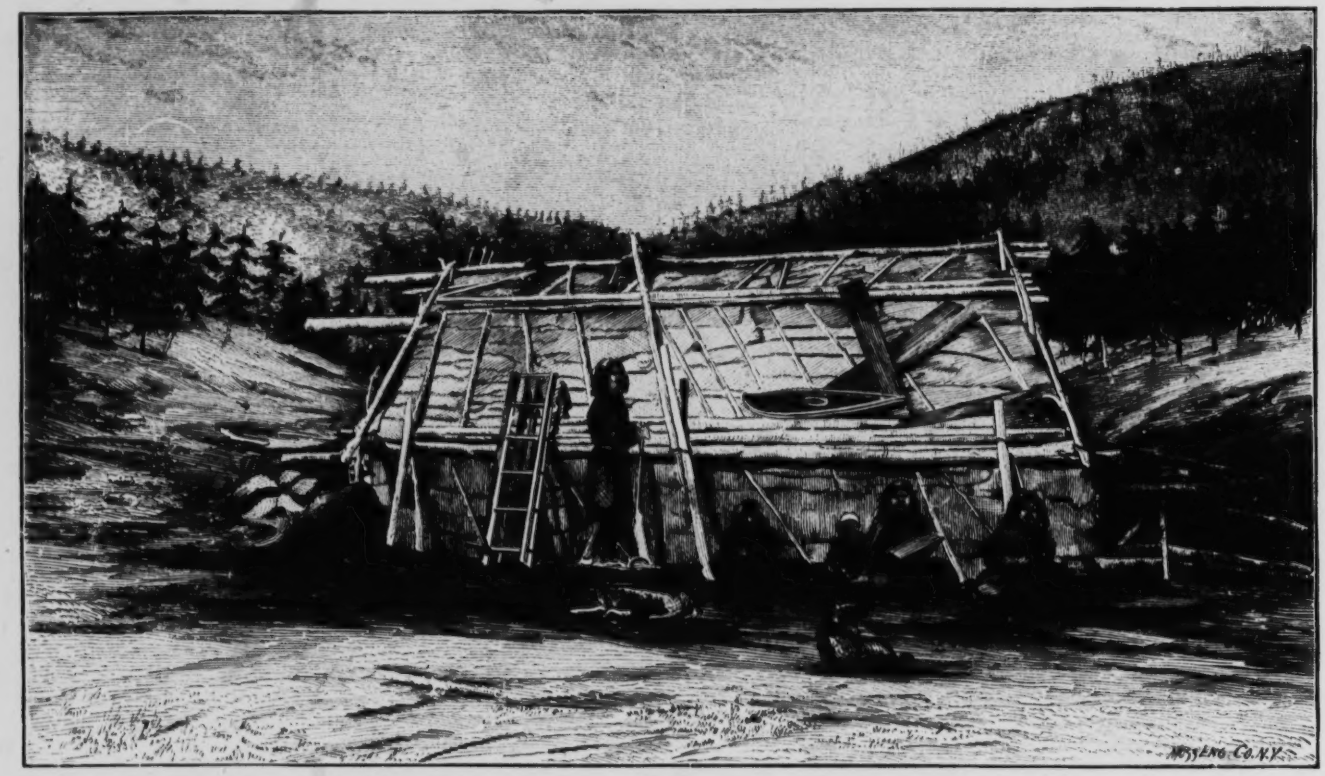
At the upper end of Wood Canyon, 60 feet above the river bed, was a welcome sight to our eyes—the first house we had seen since leaving Alaganik. This was a small spruce barábarra, about 11 feet by 14, and a fair specimen of the houses of the Copper River natives. To get into this it was necessary to crawl through an aperture about 2½ feet high and 2 feet wide, passing through a "storm chamber" about 3 feet long. There were no persons at this house, but in the cache were a few half-spoiled dried fish, of which we made a meal. This place was evidently used as a fishing station during the summer season. We would probably have passed by without having seen it had our natives not known of its existence. Our first impression on visiting the house was that it had not been used for years, but subsequent developments showed us that it had been inhabited during the preceding season and probably many seasons in the past. On one of the upright pieces of the barábarra, opposite the entrance (the usual place for interior decoration of a Midnoósky dwelling), were hieroglyphics, representing men and their actions, which our friends interpreted and enjoyed very much. They were surprised that we did not understand these, and our failure to do so afforded more evidence to them of their superiority over us. We were not aware that this was also a suburb of the far-famed Taral, which we reached the following morning, 2½ miles farther up the river.

The ice in the canyon (Wood) and above was very perilous. In many places our trail lay over detached pieces, some of which were on end, due to the jam. In one instance I saved myself from a cold and dangerous submersion by catching with my arms as I was going down.

Taral, the metropolis of the Copper River country, was saluted by us, at the urgent request of our native friends, at a distance of about 400 yards. The natives had spoken very much of John, the prospector, and about whom they expressed fear lest famine had overtaken him. The answer to our salute of many rounds was a single shot, and finally, at the edge of the bluff above us, one man, one woman, and two children appeared. The man was John, certainly the most uncouth specimen of manhood that I had, up to that time, ever seen. He was a picture of wretchedness, destitution, and despair, suddenly rendered happy. John was reduced to a single round of powder, which he fired in answer to us, supposing that the long-absent natives were returning alone from Nuchek. He had sent down some skins by them, and had expected them back four weeks earlier, with a liberal supply of ammunition. In the mean time he had been living on rabbits which he snared, with occasionally a piece of dried salmon as a luxury. He was shortening his belt one hole every other day. At one time he declared the rabbits to have been very scarce, and starvation staring him in the face, a fact that his diary recorded. Nowhere did I ever receive such a warm greeting as at Taral from this naturally heroic specimen of manhood, then so depressed with hunger and destitution. After having satisfied himself and answered our many questions, he sat up or walked about the rest of the night. He had ascended the Copper River during the previous summer with the Midnóoskies in a baidarra, and had reached Taral with about 300 pounds of provisions, which he claimed were stolen from the house while he was away prospecting for minerals. The Midnóoskies, unable to reach Taral with their provisions and those of John, had dropped him and his at Tetahena, or Bremner River, to which place they afterwards went back for him. He did not reach Taral therefore until September, by which time the cold had set in and prospecting was soon rendered impossible. John is a practical miner, having had many years' experience. He was disposed to consider the prospects for minerals around Taral of little value, though eager to visit the copper region situated somewhere on the Chettyna River, which empties into the Copper River 3 miles above.



WOOD CANYON.



TARÁL.

We reached Taral April 10, with 230 pounds of food, with which to subsist a party of five white men and a number of natives until the Yukon River was reached, if this was possible. Our stay was passed in drying clothing and provisions, taking observations for latitude and longitude, and inspecting the nearest caches for dried salmon.

The condition of the river by this time rendered sledding no longer practicable; besides, I was unwilling to pass such an important tributary of the Copper River as the Chettyna without learning something about it and the supposed stores of minerals existing thereon. These reasons caused me to stop progress in the direction of the main stream.

The coast natives, who had reluctantly accompanied us thus far, were now dismissed, and with a few fish bones (the inward part of the fish, cured specially for dogs) set out for Alaganik, much thinner and more careworn than when first met by us. I considered their return perilous on account of the condition of the ice, a fact they realized. In speaking about it their faces would assume a pitiful expression; their worn-out moccasins and bloodshot eyes were alluded to. Altogether I felt much concern about their safe return, and promised each of them part of the abandoned rations for his individual use. This measure was probably useless in view of the attending circumstances. Letters were sent back to the department commander by these natives, informing him of our future movements as far as it was possible. These arrived at Vancouver Barracks, Washington Territory, in June, 1885.

The Midnóoskies who had accompanied us, excepting Wahnie, deserted us, one going up the Copper and two up the Chettyna.

We heard much of Nicolai, the proprietor of Taral, Tyone of Chettyna, and chief trader among the natives, whom we had expected to find at Taral, and for whose uncertain abode on the Chettyna we would soon start.

Taral proper consisted of two houses, the one occupied by John, a winter house, and a summer house, at the time unused. John had constructed within the winter house a very small log hut made from the dwarf spruce timber which grows in the vicinity. At a distance of about 1½ miles from the winter house (Taral) was a spruce bough tepee, rectangular in plan, used by several women and children. Slight traces of the Russian odinátschka yet remained, also part of a huge Greek Catholic cross. From this place the daring Seréberinikoff started May 16, 1848, never to return.

Our fish buyer returned late in the evening of the second day after his start, bringing 25 dried salmon, all that could be obtained, though he was supplied with tea and tobacco, the most precious of luxuries to the Midnóoskies, with which to purchase them. Ten of these were given to the destitute women and children. Our effects, including 180 pounds of provisions, were cached at Taral, and we left the following morning to explore the Chettyna River, with 22 pounds of flour, 25 of beans, 3 of bacon, a little tea, and 15 dried salmon.

ALONG THE CHETTYNA RIVER.

The party now consisted of 5 white men and 1 native. The packs were divided so that each man should carry an equal portion of baggage that was for the general welfare. An allowance of one blanket per man, a sleeping bag, or its equivalent, and a change of underwear was agreed upon for each. Carbines, pistols, ammunition, and cooking utensils were no small part of the weight. Any of the party was at liberty to carry articles of "luxury," provided he had also his allowance. One carried an extra blanket, another a coat or shirt.

From this time we began to realize the true meaning of the much-used expression "living upon the country." The provisions with which we started could easily have been consumed by us in four days, but they were held as a reserve. Our main dependence was on rabbits, the broth of which was thickened with a handful of flour.

The snow had nearly all disappeared on the river-beds and lowlands, and much of the journey was now over granite bowlders and pebbles. Our feet were encased in native boots, and to persons unaccustomed to such footgear the use is a severe trial.

On April 13 we came up with Skilly, the Midnóoski, who would not wait and start with us from Taral. He had parts of a moose that the wolves had killed during the winter.

The following is from Fickett's journal:

They had left a few scraps lying around, and these, that neither they nor their dogs would eat, we were forced by hunger to gather up and make a meal on. This is Lieutenant Allen's birthday, and he celebrated it by eating rotten moose meat.

If we had been so fortunate as to obtain even rotten moose meat a few days later there would have been none of the party top dainty to enjoy it. There were both snow and sunshine on the day of the 13th; on the night of the same day ice froze two-thirds of an inch in thickness. This cold was greeted with joy, because it enabled us to pursue a more direct course and permitted us to walk on the ice rather than the pebbles, a boon to our much swollen feet.

About noon of the 14th we passed three deserted houses on the south bank of the Chettyna, much concealed by a growth of cottonwoods and alders. Our camp was at the mouth of a small stream, reported to flow from a lake about 20 miles to the north of the Chettyna. This spot had been chosen as a camping ground, and had a bathhouse erected near the spruce-bough tepee. From here one of Skilly's subordinates started to the lake, where we were informed his mother lived. The name Skilly, by which we had known our native friend, I found to be a term applied to the near relatives of a chief. Our Skilly was a brother of Nicolai, whom we hoped soon to find, and upon whom great dependence for future assistance while on the Copper River was placed.

On the 15th we obtained observations for both latitude and longitude. To our camp, 30 miles from Taral, the general direction was east-southeast. We had passed through the slaty formation characteristic of Taral above and below, and had reached a point where the northern bank of the river was steep, high, and of yellow clay, with traces of alkali. Notwithstanding the numerous bowlders and pebbles of granite in the bed of the river, no banks of the same material had yet been seen. The sun during the day had again loosened the ice in the river, and crossing it became very perilous. In an ordinary river such frequent crossings would not have been necessary, but in rivers similar to the Copper or Chettyna to follow a channel, if it were possible, would be to add from 30 to 40 per cent to the distance. The beds of these rivers and their tributaries are frequently 1 mile wide, with several channels.

Near the end of the day's march found us with deep, impassable water to our front and right, and a very high, rugged point to our front and left. To climb this when in good physical condition, without packs or guns, would have been a difficult task. To cross it under the circumstances severely tested both the courage and strength of the party. The most difficult of all our endeavors, however, was the necessity of hunting supper at the expiration of such a day's march. Sometimes a halt was made during midday to hunt food for supper.

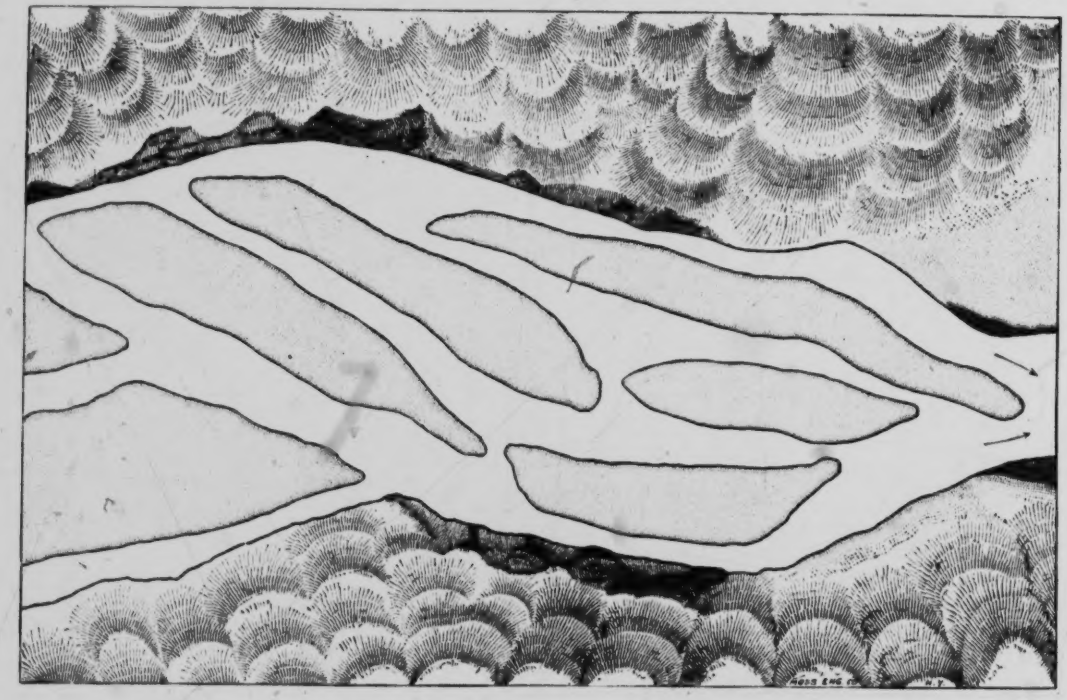
On the 17th we started at 7 a. m. from the mouth of the Chettyna, which bore no signs of breaking up, and having marched 5 miles, went into camp. The following is from Fickett's journal:

Rotten moose meat would be a delicacy now. So weak from hunger that we had to stop at noon to hunt. All so weak that we were dizzy, and would stagger like drunken men.

Fortunately, an old woman brought into camp a small piece of meat and a moose's nose, which, with the rabbits we killed, considerably strengthened us. The old woman was Wahnie's mother, who was in camp a few miles from the river. The latter, while out hunting, had gone to her brush house and told her to bring over the meat. She reluctantly obeyed, crying in a plaintive voice, "Skunkái deschâne keelán" ("My children are very hungry").

The hunting party, for such it was we were near, consisted of two men, two women, and a number of children. They had been very unsuccessful in hunting, and were accordingly in reduced circumstances; yet we obtained of them a little meat. Our importunities for more were silenced by the verification of the old woman's sentence.

One of the men of the party was a "skilly;" the other unfitted by age from carrying a pack. From them I learned that Nicolai was on the head waters of the Chettystone, near the mouth of which we had camped the previous day. At one time they would tell us that Nicolai had "Tenáyga keelán" ("Moose plenty"), at another that "Nicolai deschâne keelán" ("Nicolai is very hungry"). At this camp the skilly, who had been with us at times since our start in canoes from



CHARACTERISTIC SECTION ON THE CHITTYNA RIVER.

Alagánik, left us to go to his house on the Central Fork of the Chettyna, at a distance of 1½ suns. Upon the Northern Fork—the Chettystone River, so called by us on account of the copper ore found by the natives near it—was the home of Nicolai. The Southern Fork, we were informed, was uninhabited, and must, from the reports of the natives and configuration of the country, have its source a little to the north and west of Mount St. Elias. The Central Fork is the principal one, or Chettyna River, and from Skilly's house to its glacier source is 1 sun, making a total of 2½ suns from the confluence of the Chettystone. From the confluence of the Chettystone to the source of the Southern Fork is about 1½ suns. From our camp, 5 miles above the Chettystone's mouth, to Nicolai's house, via the portage, is also about 1½ suns. His house is near the glacier source of the tributary. By the term "sun," as used above, the Midnoóskies mean a day's march. In making short marches the Midnoóskies, as do most of the natives of the Tanana, travel with remarkable speed, but they never load themselves with weight to exceed 20 pounds. Generally they carry, besides a very light gun, only a skin blanket, with dimensions of 4 by 5 feet. I do not refer to the men slaves, who bear packs equal to those of the women. A day's march with them is so very variable that we had no definite mode of arriving at the distances to the sources of the tributaries except by reduction of the time it required us to reach Nicolai's home; and using this as a standard, I have traced in dotted lines the supposed courses of the tributaries. Had I considered it prudent to attempt the source of Central Fork, subsisting on rabbits alone, with no prospects of any other food, the chart would not now show dotted lines. The party was daily growing weaker on account of an insufficient quantity of food.

The skilly of this camp, after much persuasion and rewards, was induced to go with us to Nicolai's, but would carry nothing except the "white tyone's" pack (mine). I was much degraded in his eyes by carrying a pack of any description, and yet more so when I shouldered the moose meat we had obtained from him. On April 18 we started overland for Nicolai's. For an hour our course lay along the south bank of the Chettyna, then across it, over the treacherous ice, to the north bank, into a wood of dwarf spruces and deep moss. After an hour's marching through this we unexpectedly found ourselves on a high bank of the Chettyna, from which with the field glasses we could see the locality pointed out to us as the junction of the Central and Southern forks. The distance, in a right line, I estimated to be 20 miles. From this point the bearing of the junction was southeast by south, and our course for the rest of the day was as nearly constant as trail travel can be, and was about east 20 north.

There was no trail, and nothing to indicate the way save the blazing of the trees, which had evidently been done only a few weeks previous. When we halted for our noon meal a considerable quantity of the moose meat and two or three blue grouse were eaten, yet our hunger was not appeased. The skilly, soon after the halt, had fainted away, and remained in this condition during most of the meal. Wahnie felt much uneasiness concerning him, but most of the party seemed to realize the old maxim: "All is for the best." Certainly the portion of the meal intended for him was relished by us.

We left camp the following morning at 6 o'clock, and after marching about 7 miles found the strength of the entire party nearly exhausted. All of us now realized that a diet of meat alone should be very abundant to produce the necessary working strength. After consuming all the food on hand, we started off with the hope that Nicolai would have something for us, and we were not disappointed.

The last 5 miles of our march was either on the ice of the Chettystone or very near the river. Many rounds of ammunition were fired by us in answer to Nicolai's salute. On occasions of this kind a Midnoóski will fire his last charge of powder, though hunger stare him in the face. It is courtesy that each shot be answered, and the number of shots with them, as with more civilized people, indicates the rank of the tyone. On one occasion, on the north side of the Alaskan Mountains, probably 150 shots were fired to welcome us. Long before we had reached the source of Copper River I was compelled to limit the number of shots, lest our supply of ammunition be too much reduced. We were always so delighted to arrive at a settlement that a celebration of some sort seemed very appropriate; moreover, it was claimed the greater the demonstration we made the more food we would obtain.

It is also en regle among the natives to provide some kind of refreshments on the arrival of a guest, and we early learned to expect it as a matter of course. After having been once so entertained, any subsequent meal must be purchased, and that at a very dear price. They realized our necessity and made the most of it.

To reach Nicolai's house we had marched a distance of 30 miles, and on finding on the fire a kettle with a capacity of about 5 gallons, filled with meat, we were happy. The allowance of this per man, exclusive of the broth, of which we drank large quantities, could not have been less than 5 pounds. Much of it was fat or tallow run into the small intestines of the moose. All immediately fell asleep after eating, and on awakening were nearly as hungry as before. The donation of such a quantity of meat was frequently cited by Nicolai to show how great a tyone he was. More will be said of him, his people, and surroundings under the head of "Natives."

We soon examined the contents of the surrouning caches, and from our inspection of them concluded our guns must be largely depended upon to win us our food.

The 20th being stormy, the party rested, and gorged itself on moose, beaver, lynx, and rabbits, cooked entirely in native style, which does not reject in their preparation the entrails in toto of the last-named animals.

After much talking with Nicolai, he promised to make a baidárra of moose skins and go with us as far as Taral, but would not agree to ascend the Copper River. On examining the river we found that the ice would not permit the use of a baidárra. Nicolai wanted to postpone the start for twenty days, but finally, through fear that we would go to Taral before him, consented to begin the construction of the boat immediately. We were supposed to be in the heart of the mineral region, south of the Alaskan Mountains. This subject will receive attention farther on.

While lying over at Nicolai's, awaiting the going out of the ice and the making of the baidárra, observations for position, hunting, repairing clothes, and making moccasins were the chief occupations. We found that the Chettystone had three forks, nearly equal in size, and that each one had a glacier source; that the principal mountain range, as seen from near one of these glaciers, makes an angle of about 30° with the general course of the river.

We were informed by Nicolai that tebáy (a variety of sheep, described under the heading "Animals") were plentiful; repeated attempts to obtain them resulted in two only being brought in during our stay. Rabbits were now, as heretofore, our chief support.

April 26 found Nicolai's "larder" nearly empty, and though the baidárra was about completed, a further postponement until the 28th was agreed upon to enable us to obtain some food. Fickett, Nicolai, and two natives started out with the intention of reaching the home of the tebáy and hunting on the 27th; but snow falling to the depth of 4 inches, and being accompanied by a strong wind, prevented hunting on the craggy peaks frequented by these animals.

On the 27th our host's two wives and four children started afoot over the trail we had so recently traveled. They were to be joined by us at the mouth of the Chettystone. On the 28th we started down the Chettystone River in our baidárra, covered with untanned moose skins. Its length was 27 feet, beam 5, and depth 22 inches. This boat was our only means of transportation from this time until May 31, when it was abandoned near the head waters of the Copper River. It deserves a description. The framework, including keel, ribs, gunwale, etc., were constructed with no other tools than an ax and knives, which were of native manufacture. The assembling was done entirely by means of rawhide strings and willow sprouts. The seams in the cover were double sewed, and with sinew.

The skins, after being sewed, were placed in the river, where they remained several days prior to the stretching over the very flexible frame. The sewing is work allotted to the women, but an art in which the men are proficient. It would not be considered disgraceful for a man to sew, provided no woman is present; otherwise his self-respect would not permit him to use the awl and sinew. The skins were not in anywise cut to fit the boat; four skins were used; hence the boat contained three double seams. The fitting was due to the elasticity of the rawhide. This was made taut by rawhide thongs, passed successively through holes in the skins, then under the side pieces. The surplus skin at the bow and stern was folded so as to offer as little resistance

WAHNIE AND HIS MOTHER, NICOLAI AND HIS WIVES.

as possible to the current, special care in this respect having been given to the bow. The boat, when completed, was very flexible and unsightly, but proved to be one of the hardiest small crafts I have ever seen.

The Chettystone, like the Chettyna and Copper, has in places a very wide bed with numerous channels. Our boat, though flat-bottomed, grounded frequently, when it became necessary for all to step out into the channel and wade. During our first half day down the Chettystone we might have been designated as either a boating or wading party. Could all the channels of water, however, have been united there would have been no grounding. The current would easily average 6 miles per hour. The ice along the edges of the channel was from 4 to 6 feet thick, and largely the result of the solidification of snow. On one occasion, by holding to the rope, we permitted the boat to pass, stern forward, under an ice bridge.

Six miles below Nicolai's a small tributary of deep yellow color enters. Nicolai called it the Chettyto (Copper Water), and says that copper gives it its peculiar color, and causes the water to be so distasteful to salmon that they never ascend the stream. Its entire length is probably not more than 15 miles.

When 10 miles down the back bearing showed Nicolai's house to be due east. The run of the day was about 45 miles, though the right-line distance would probably not exceed 20 miles. From camp the back bearing to Nicolai's house was 5° south of east.

At night a snow of 2 or 3 inches fell, and Nicolai was loath to start the following morning, declaring during my conversation with him that a tyone should not be ordered. When he saw our stores loaded in his boat he sullenly decided to put in his property and accompany us. After a run of 25 miles in a torrent, most of which was through zigzag canyons, we were halted by ice, ¾ of a mile from the Chettyna. During the run down the river our aristocratic companion, to his great pride, acted as captain of the crew and gave all directions, which could be abbreviated into three phrases: "To Kwûl-le," "To Keelán," and "A-tó." The first means shallow water; the second, deep water; the third, paddle (verb). If the channel were difficult, in a loud voice he would repeat several times "A-tó." The shorter the turns and narrower the channel, the more necessary to have the speed of the boat exceed the rate of the current, a fact well known to our experienced captain. Lessons in steering from Nicolai proved of great value in running the rapids of the Tanana, down which the natives could not be induced to go.

After having waited a few hours for the ice to go out, and realizing no advantage by our delay, we carried our boat and baggage to the north bank of the Chettyná, at its junction with the Chettystone, and went into camp. At night we were joined by the two wives and several children of Nicolai, with their dogs, which were packed after the manner of a mule pack train. An investigation showed that the ice in the Chettyná would not allow the use of a boat, and a considerable delay seemed inevitable. Several observations for longitude and latitude were taken at this camp. In the afternoon a boat load of natives, the ones we had seen at our last camp on the Chettyna before starting for Nicolai's, passed us, but were halted a few miles below by the ice. At 3 p. m. we started out with the boat well loaded, carrying, besides our own party, 2 men, 2 women, 5 children, 12 dogs, and the worldly possessions of all.

After a descent of about 4 miles the ice forbade farther progress. It was impossible to land on the south side, where timber was near, so we were compelled to carry our scanty bedding and camping effects 1 mile to a rabbit patch on the north side. At camp we obtained quite a quantity of tombá, a peculiar variety of haw, that the storms of winter had not been able to beat off the bushes.

The following morning found us very hungry. We were joined by the baidárra of natives and started down the stream together, after having eaten the pieces of meat obtained from the skilly. This second boat, though not so large as ours, had equally as heavy a load. Our *camarades de voyage* and our own party made a sight sufficiently picturesque to even call forth remarks from several of a party more interested in matters appealing to the stomach than to the mind.

The run of the day was about 22 miles, with a bearing varying from west 25 south to west by north. The ice having disappeared from the river, now revealed a swift current, averaging

about 6 miles per hour. The mountains facing the south were nearly cleared of snow to a line midway between timber line and summit. Nearly all the snow and ice in the river-bed had disappeared. The natives informed us that this river broke before the Copper, and started the ice below Tarál. A strong wind up the river lifted so much dust from the sand islands of the river that it was scarcely possible to see to steer. On this river we also had occasional groundings. The dust and a desire to again try for tebáy sent us into an early camp.

May 3 was passed in the camp, with the party suffering from severe pains across the loins. The rest at night was much broken by the frequent action of the kidneys.

The natives returned from the hunt with 6 tebay, all of which were much smaller than the one John had killed. On May 4 we left camp, contrary to the wishes of our native friends, in quite a snowstorm, which turned into a rain toward the middle of the day. About four miles below camp we passed the mouth of a small stream that had not been seen when ascending. The natives informed us that there were tebay on it, and I have called it Tebay Creek. Four miles farther down we again passed the sweat-house camp, near the small river which I have called Dora Creek, in honor of a friend. General course during the day was a little north of west. The river possesses some very decided turns and many small rapids. At the junction of the Copper and Chettyna rivers it is difficult to determine, when the channels are partially filled with ice, which is the largest. I was in doubt for a while as to which should be called Copper River, especially since the Indian name Chettyna means "Copper River." Subsequent events showed the western tributary to be much larger, and on this account I have continued it by the better known though improper name.

We reached Taral late in the afternoon, to find our cache just as we had left it.

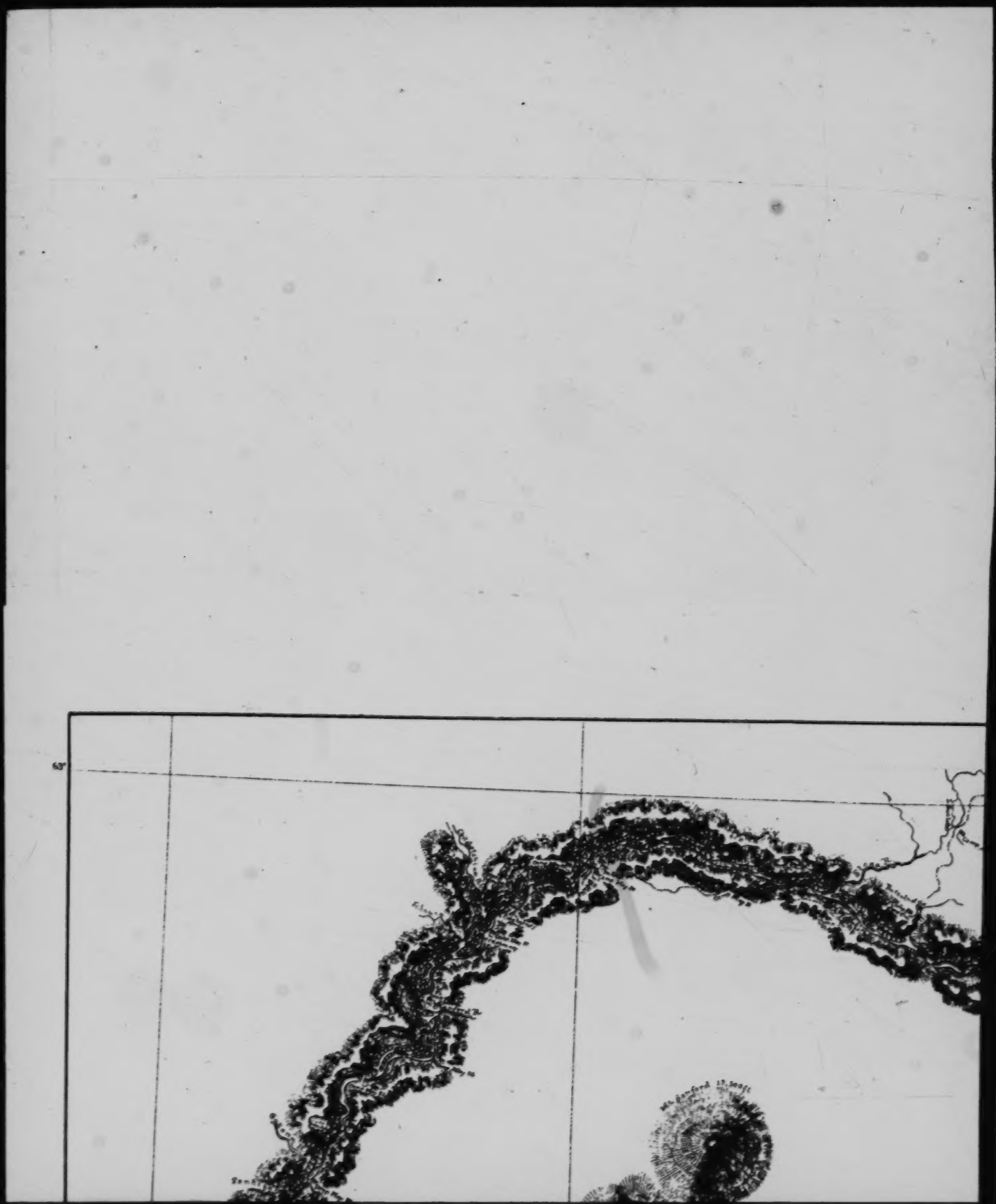
TARAL TO THE TAZLENA RIVER.

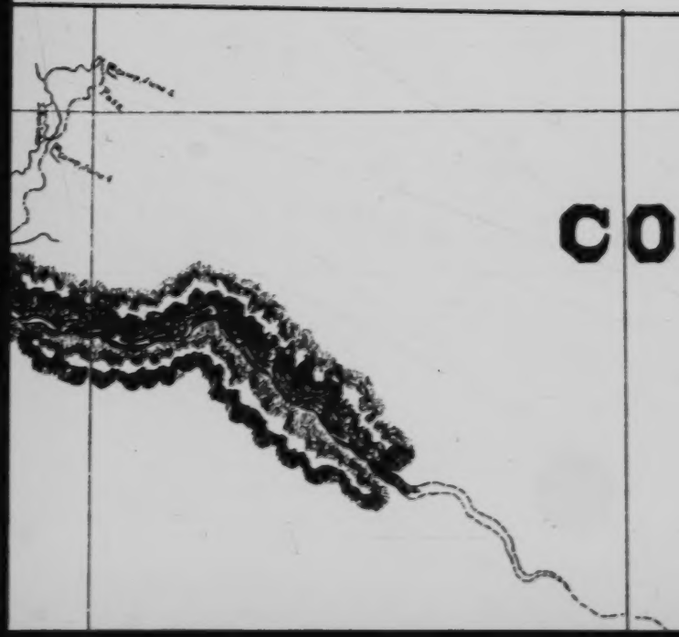
The day after landing at Taral was passed in writing letters, taking observations for position, taking photographs, and recuperating as much as possible on "white man's food." As usual, the natives were reluctant to start. Besides our own party we had Nicolai, Wahnie, and two other Indians. We now began work of a new kind, viz, cordelling, or tracking. Nicolai continued as steersman, and one other of the party remained in the bow with a long pole. The rest of the party pulled on the rope, which was about 150 feet long. We had not fully realized the strength of the current until now. A measurement showed a current of from 7 to 9 miles per hour. This velocity was obtained by measuring a distance along the bank, and observing the time required by a stick in passing over a corresponding portion of the river. The entire absence of canoes on Copper River is evidence of the swiftness of its current. The usual communication of the natives is afoot in ascending and by raft in descending. The baidarra is used for transportation to the trading station, Nuchek, and when an extended descent of the river is made. If it is used in ascending, it is always cordelled. The subject of "communication and transportation" is more fully given in another part.

One mile above the mouth of the Chettyna a torrent empties from the east side; from its mouth the bearing of Mount Wrangell is north 10° east. From our camp, the home of an old man and his family, the bearing of the same is north 20° east. From this time until the Yukon River was reached, we never failed to purchase or trade for all food the natives possessed or would consent to let us have. At this old man's there was none. The settlement numbered nine in all.

At noon the next day we reached Messála's house, on the east bank, at the mouth of a small creek. Until within the past few years he had been head chief of the Atnatánas; but infirmity had deposed him, and left Conaguánta and Nicolai the principal men. He is the chief that led the natives in one of the Russian massacres, and manifested fear on my arrival, lest my mission had to do with him. After he had learned my business he seemed much easier, and wept at being able to offer us only half a dried salmon each. His face yet bears the characteristics of a man well fitted to rule. Both he and his wife are blind.

From the first camp above Taral (Camp No. 1) to Messála's the general course is north by west, with two rather marked curves; from Messála's to Camp No. 2, at an Indian house, the





COPPER AND CHITTYNA RIVERS, ALASKA.

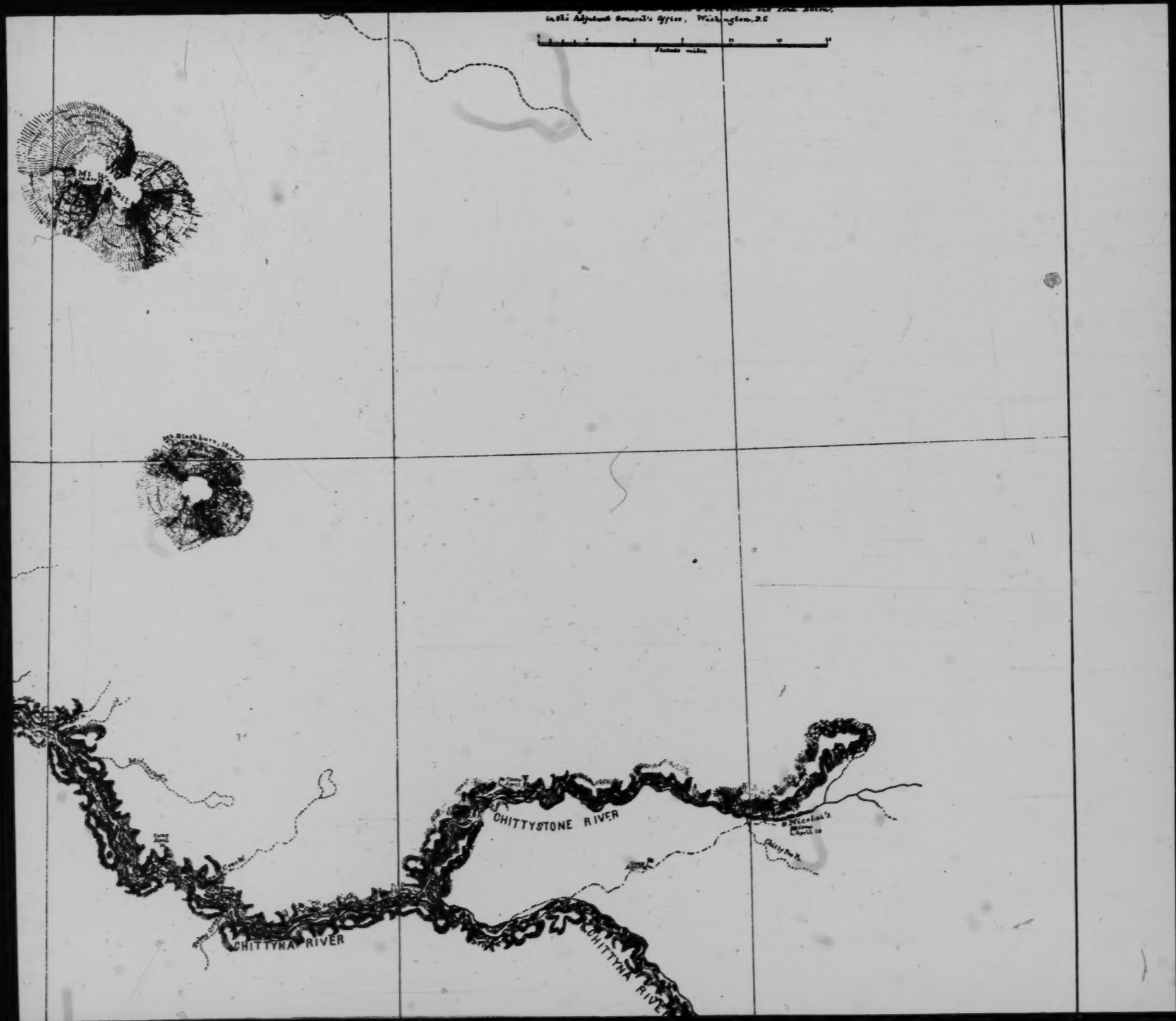
FROM EXPLORATIONS OF PARTY

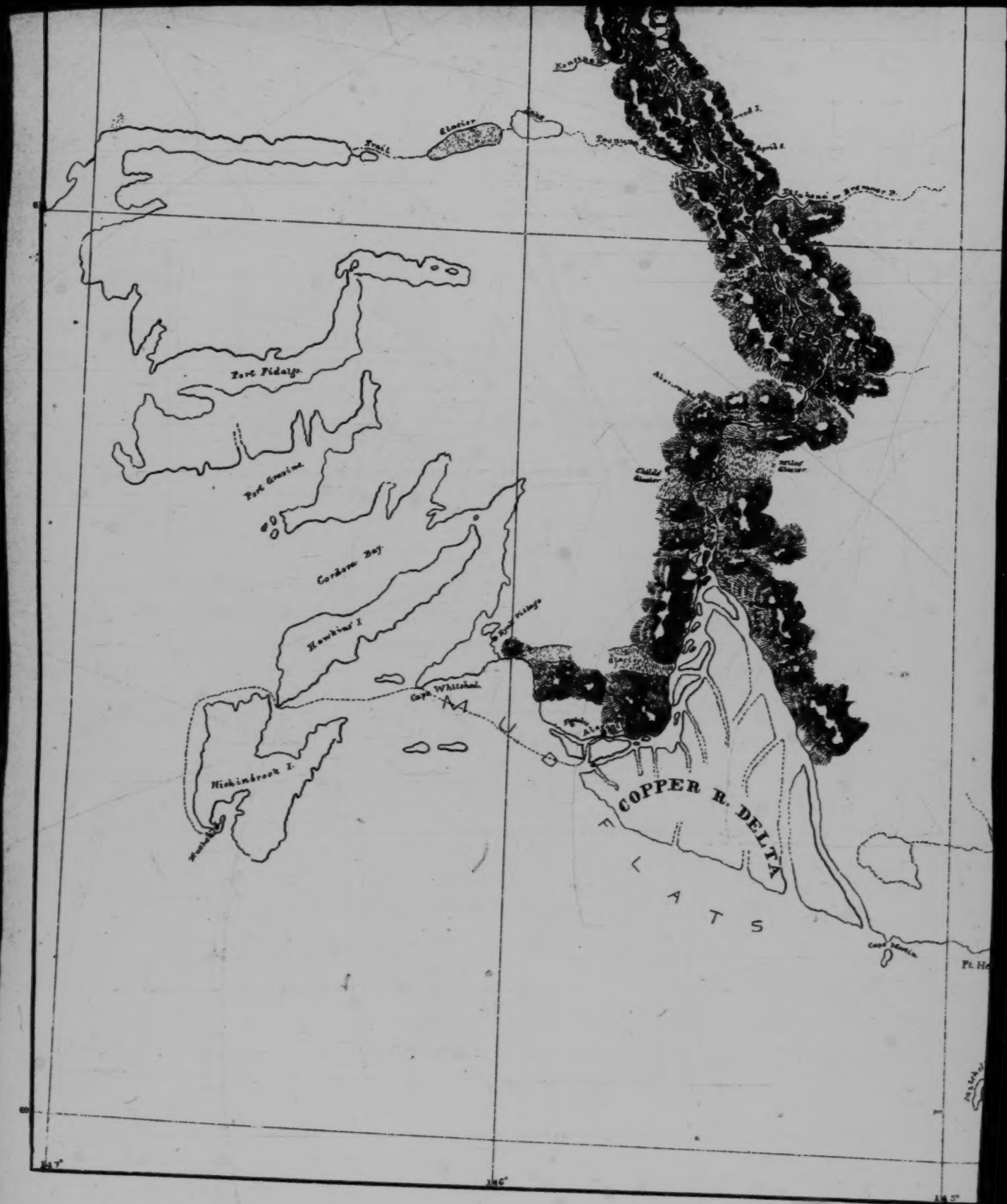
COMMANDED BY

LIEUT. H.T. ALLEN. 2d U.S. CAVALRY

Drawn by Lieut. Allen and Messrs J.H. Colwell and Fred. Estes in the Adjutant General's Office, Washington, D.C.

UPPER RIVER
Lower


CHITTYSTONE RIVER
CHITTYNA RIVER
CHITTYNA RIVER


Port Fidalgo
Port Gravina
Cordova Bay
Hawkins I.
Hinchinbrook I.
Cape Whitshed
COPPER R. DELTA
FLATS
Cape Martin
Pt. Ha
146°

RIVER

Central Branch

South Branch

Pt. Hay

Controller's Bay

Kendall I.

Keyes I.

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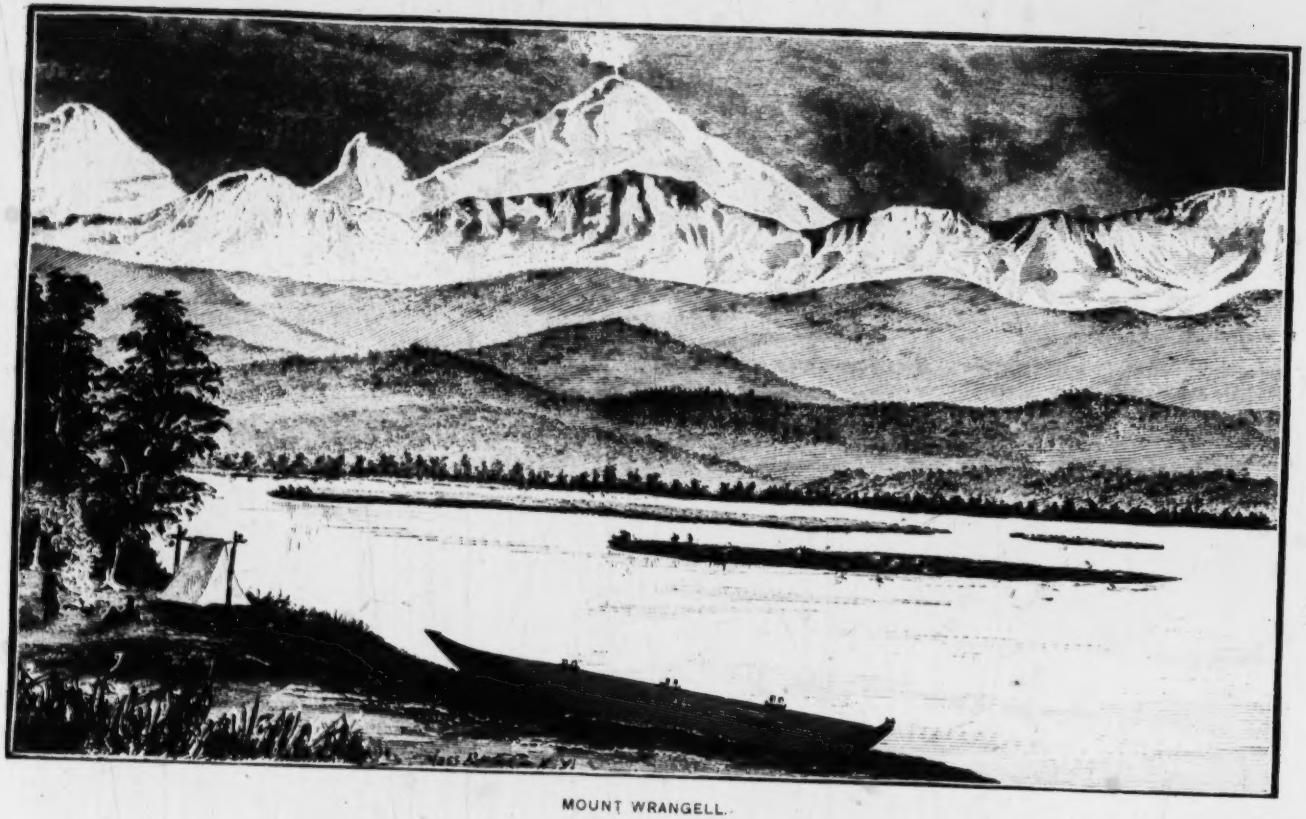


MOUNT WRANGELL.

course is northwest one-half degree west and about 6 miles. Vegetation had now begun to respond to the spring sun, and the "natural terraces" just below Camp No. 2, with their greenish grass covering, were a pleasing sight. These terraces present the same appearance as would the front of a huge earth fortification. The uniformity of the two slopes, one above the other, the uniform height of each parapet for several hundred yards, would seem to indicate the work of man rather than that of nature. At the camp a single woman was the only inhabitant, her husband having gone on a hunt. Camp No. 3, 7 miles farther up the river, four of these lying in direction west one-half degree north, three north-northwest, was just above Kotsena Creek, a small stream emptying on the west side.

Camp No. 4 found us at Liebigstag's settlement, the most populous one yet met, numbering 30, including men, women, and children. Liebigstag, the tyone of this settlement, is nearly an equal in rank to Nicolai, though not nearly such a diplomat. A part of his constituency is on the flat on the east bank, just above the torrent stream flowing into the river almost directly from the northern base of Mount Wrangell. His summer headquarters was on the west bank, on the very edge of a bluff 600 feet high, as determined by a barometer. From our camp on the flat we could barely hear the reports of guns fired as a salute to us. Our approach had been heralded by two men whom we had met a number of miles down the river. These acknowledged allegiance to Liebigstag, and considered it their duty to immediately change their plans, return, and inform their sovereign of such a previously unknown event. Seréberinikoff possessed the most Caucasian blood of any one that had ever visited these regions. We were invited to Liebigstag's house on the bluff. To cross and recross the river here was no easy task, yet Fickett and myself, with Nicolai and several natives, attended the feast, and a bountiful one it was. Never have I known lines of caste to be so rigidly drawn as with these people. I was considered the chief, and in ascending the bluff natives had come down to escort us up and carry my bed. Two half-grown boys preceded to the summit, then took station on each side of the trail till I had passed between them and had entered the spruce-bough tepee. There I found all allotted places according to rank; Liebigstag and blood relatives on the right side, "retainers to camp" on the left. Places on his left and right respectively were reserved for Nicolai and myself. Fickett was assigned a place with the *'oi polloi*.

I did not have time nor was it in my instructions to attempt any reform in their social or political customs; yet had we been less dependent on the natives I should certainly have let them understand that the ablest worker was the chiefest man, rather than continually make presents to the recognized tyones. On one occasion, when I attempted to snub a lazy chief by making a much-prized present to one of his vassals, and a splendid worker, rather than to himself, he pocketed the article and took all credit to himself for possessing so valuable a worker. These tyones barely condescended to consider me their equal, and on no occasion would they consider my men as such. They were reluctant to believe that any one who would pull on the rope of a boat, carry a pack, or take equal foot with his men could be a tyone. At this camp we obtained a considerable quantity of meat and quite a following of natives to pull on the boat and hunt. From Liebigstag's camp is one of the finest views I have ever seen. The mountains to the east and north of the river are grand. The most southerly of the prominent peaks is due east, and has been called by me Mount Blackburn, in honor of Hon. J. C. S. Blackburn, of Kentucky. Its elevation above the river is about 12,500 feet. The bearing of Mount Wrangell from same is northeast one-half degree east, and has an elevation of about 17,500 feet. The next peak above, called by me Mount Tillman, in honor of Prof. S. E. Tillman, of the United States Military Acadamy, is about 16,600 feet high, and probably ranks third in height among the peaks of North America. The next is Mount Drum, 13,000 feet above the sea level, called in honor of the Adjutant-General of the Army. The last prominent peak, barely visible from the same point, has been called Mount Sanford, and is 12,500 feet in height. The determinations of the heights of these peaks did not involve the rotundity of the earth, but simply the solution of plane triangles; hence can not be accurate. Frequent compass bearings of them, taken as we ascended the river, also the vertical angles with the sextant from the same points, furnished the data for the determination of height and position. A reasonable approximation is all that is

claimed. The accompanying sketch shows the mountains, including the high peaks. Looking to the north was Copper River, with its numerous gravel islands and channels, with plenty of ice in it both packed and floating as yet. Between Mount Wrangell and the river are three ranges of mountains, one of which was snow covered, thus proving its elevation to be considerable. Along this part of the river absence of rocks characterizes the banks. These are very variable in height, and chiefly of recent sedimentary deposit. There is splendid grass near the river, and the flat opposite Liebigstag's had the appearance of an excellent stock range. It was sufficiently elevated to be dry, and was partially timbered with cottonwoods and spruces.

After exposing a number of photographic plates, the party started off with a liberal supply of moose meat, and as a consequence in excellent spirits. We now had seven natives to assist in cordelling, besides the two tyones and two hunters. With Liebigstag as captain, our chances for taking the most direct channel were much increased. Beyond this our first natives were little acquainted. For several days only two whites kept with the boat; the others followed the trail along the east bank of the river, which at times lay several miles away. The party following the trail was supposed to furnish game, but its efforts to do so were not very successful. An occasional goose or duck was killed in the river or a slough, but our chief dependence was rabbit.

After leaving Liebigstag's the river continued to bend westward, the general bearing being between northwest and north-northwest. On May 11 we sighted the small mountains that give rise to the stream on the west bank, called by the natives Klutena. These mountains are a continuation of the range to the west of the river, but are so low that very little snow was on them. From the same point Mount Wrangell, sending up a white smoke or vapor, bore east 25° north. after one of the longest day's marches while cordelling, we went into camp about 20 miles above Liebigstag's, from which camp Mount Wrangell bore east 12° north and Mount Drum north 30° east. From Camp 5 to mountain behind Taral the bearing was southeast ½° south.

On the 12th we traveled 6 miles west ½° north, then 3 miles west-northwest, and went into camp 1 mile above Conaquánta's winter house. He and his immediate family were out in a hunting camp, but our halt was with a band of his followers, all of whom were arrayed in their best to welcome us. Our approach was, as usual, heralded several hours in advance, and it had now become imperative on me to make an official visit to the ranking man of each settlement, however small. At this settlement, the most numerous on Copper River, were 23 men, 8 women, and 16 children. To our great surprise, we found a few pounds of flour and a few ounces each of tea and sugar, besides some fancy cups and saucers. The possession of the latter was an infallible index of Tyoneship in one of its grades. Their flour had come from Tasnai, which to this time we had been led to suppose was at the mouth of the Tanana River, but which in reality was the mouth of the Sushitna, in Cook Inlet.

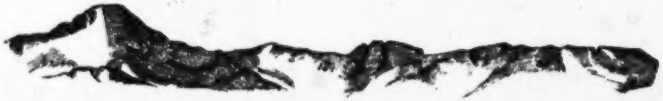
I had frequent maps made by the natives to show us the trail over the Alaskan Mountains and down the Tanana to the Yukon River, all of which indicated the route to be via the Tazlena River to Tasnai. The accompanying sketch represents one of the maps thus made. Since leaving the Chettystone we had been deluded into thinking we knew our course. The strong tendency of the river to the westward and the comparatively low latitude, as determined by our observations, awakened my suspicions, but it was not until we reached the Tazlena that I felt sure the trail up it could not lead over the Alaskan Mountains, but rather to Cook Inlet.

Having obtained observations for positions at camp, we left the following morning with but four natives—Nicolai, his two vassals, one of whom was Wahnie, and Chetoza, a vassal of Liebigstag, who had to be amply rewarded for permitting him to escort us. The assistance rendered us by the many natives recently with us was valuable, but their ceremonies and great sense of rank were very oppressive to my party. Nicolai, when with Tyones, was equal to or worse than any of them in this respect, but when with us only he was much more endurable. None of the natives would sell us food of any kind without consulting him, and he advised prices that would make a commissary in civilization shudder. They realized full well our dependence, and made the most of it. Instead of acceding to our terms, we were almost invariably compelled to yield to theirs.

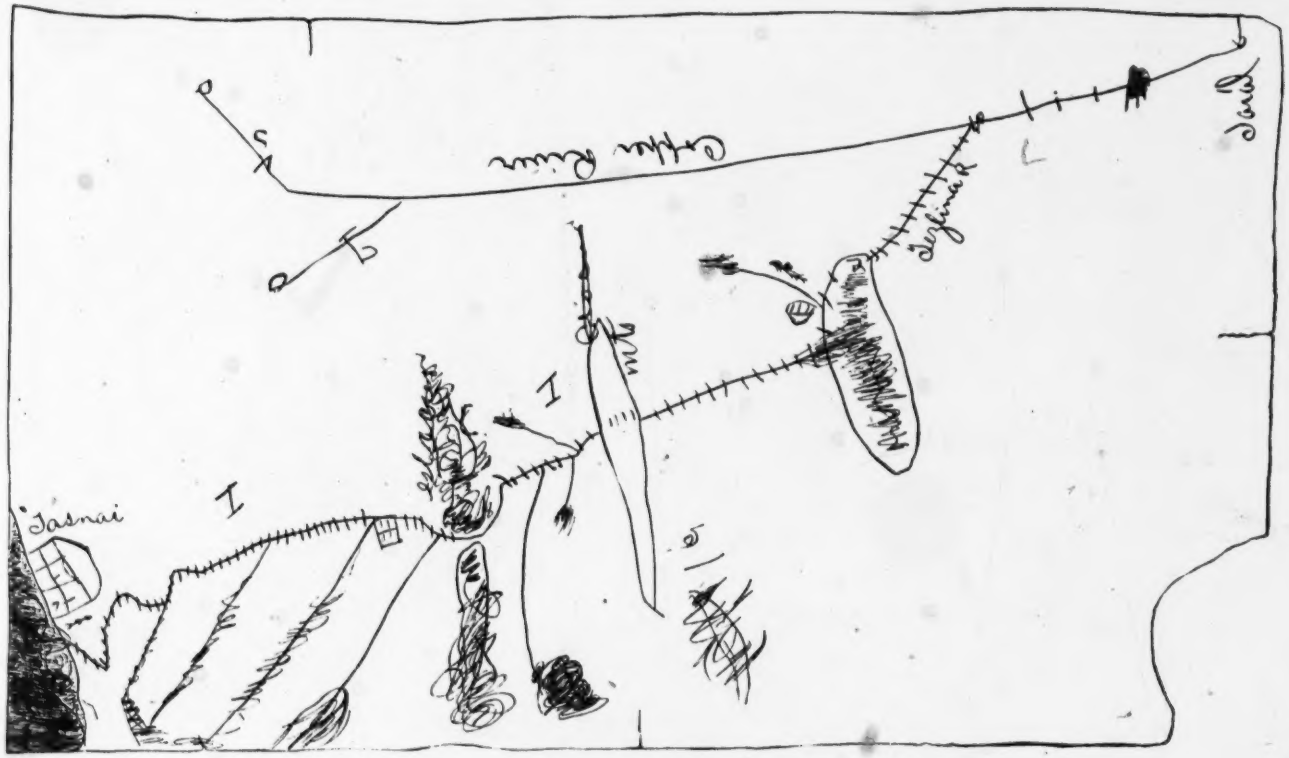
At 1 mile from camp we passed two more unoccupied houses of Conaquánta, the best found

Mt. Sanford. Mt. Drum, 13,300 ft. Mt. Tillman, 16,600 ft. Mt. Wrangell, 17,500 ft.

Mt. Blackburn, 12,500 ft.



CREST OF RANGE AS SEEN FROM LIEBIGSTAG'S.



NATIVE MAP OF THE ROUTE TO COOK INLET VIA THE SUCHITNO RIVER.

on Copper River. Our course for 4 miles was northwest, and for 3 north-northwest, when we went into Camp No. 8.

The mean barometer reading while in camp was 28.67, which showed Camp 8 to be 750 feet above Taral. Camp 9, at an estimated distance of 9 miles from Camp 8 by the channels of the river we followed, was, according to the barometer, 110 feet higher. This is not more than the average rise from Taral northward, as will be seen by consulting the barometric table in the Meteorological Appendix. This wonderful fall of the river will account for the torrent-current which the Copper River has from its source down to the glaciers.

Midway between the camps we passed the mouth of the Klutena, the largest tributary of the Copper save the Chettyna yet passed, and a stream of size, as shown by the general topography of the country. The mountains on the west side, as far as the eye could reach, seemed to be separated by this river. Natives report this river to head near Nuchek in a large lake, where fish are abundant; that to reach Nuchek, however, would necessitate the crossing of large glaciers. Nicolai informed me that he had been to its source when he was a small boy. In accordance with his recollection I have traced it in dotted lines on the accompanying map.

One mile above the Klutena, on the east bank, enters the Klawasena, a small tributary.

From Liebigstag's to Conaquanta the river varies from a half to a mile in width, with numerous channels. From the Klawasena to the Tazlena the river is generally confined to a single channel, with decided curves. During the march the bearing varied from northwest to north 20° west. After having exposed eight plates, the photographic instruments and all the plates exposed during the time on Copper River were carefully packed and cached, to be taken down to Nuchek by Nicolai on his return.

Camp 10, May 15, found us at the mouth of the Tazlena, where we bade good-bye to Nicolai after putting in his possession several letters descriptive of the journey to that point. We had passed beyond the territory of the Atnatanas to the neutral grounds that separate them from the Tatlatans. We had to depend almost wholly on our own resources from this time forward. En route, until the headwaters of the Copper were reached, we observed the greatest destitution and hunger within our experience in Alaska.

In my letter, sent back to the department commander, no information whatever could be given of our future movements. No natives had been met who had ever heard of a trail over the mountains to the northward. The Copper River here showed little or no diminution in volume. The Tazlena, which we had expected to ascend, was little if any larger than the Klutena, and only about 25 or 30 yards wide, besides being swift, with a bed filled in with bowlders.

FROM THE TAZLENA RIVER TO LAKE SUSLOTA.

The natives informed us that we had no chances of reaching the source of the Copper; that the current was so swift that to cordell the boat would be impossible. They also spoke of the many channels, which we found to exist to such a number as to keep us almost continually in the water.

The buds of the cottonwoods were now partially opened, but the salmon would not arrive until the leaves had appeared and attained their full size. Frequently we imagined that fish had struck our legs when wading across these many channels, but this sensation proved a delusion. The ice was yet floating in the river, and the temperature of the water 43° F. A day was passed at the mouth of the Tazlena to try and replenish our supplies by hunting, but without success save to the extent of a few rabbits. Sergeant Robertson shot at and wounded a small black bear, the only large game seen save the tebay of the Chettystone.

No buoyancy of spirit characterized the party as it left the mouth of the Tazlena, entirely in ignorance of what was in store for it; and, wearied with hunger and other hardships, there was just cause for melancholy. The party had scarcely been dry day or night since leaving Taral. During the day we had an accident which might easily have proved fatal to the success of the expedition. In crossing the river, an undertaking circumstances frequently necessitated, our skin boat struck and lodged in the middle of the channel, where the current was terrific, on a

huge hidden bowlder. The dogs were thrown out of the boat, the sides of which were crushed in, and for a few minutes general consternation prevailed until we were again safe on land. Had the boat upset, our bedding, guns, and instruments would have been lost, and doubtless the lives of some of the party. This event seemed to add no little to the general depression of the party.

Two miles above the mouth of the Tazlena the bearing of Mount Drum is east 20° north. The course of the river during the day was nearly due north, with some very marked curves. From camp 12 the bearings of Mounts Drum and Wrangell were respectively east 10° north and east 13° north, with angles of elevation 3° 20′ and 5° 06′. The barometer read 28.05, showing camp to be 1,275 feet above Taral and 1,850 feet above sea level.

Before leaving camp, two runners from Conaquánta's hunting camp reached us with about two meals of moose meat, for which we traded.

The grass had now given way to the deep moss, which continued to characterize the country, with an occasional exception, throughout the remainder of our explorations. We left camp after repairing the baidárra, an operation that had become a daily necessity on account of the rottenness of its skin covering, produced by continual moisture.

One mile above camp, on an island, were springs so strongly impregnated with minerals that their waters could not be drunk. Even a sip left for a long time a disagreeable taste. The deposit on the gravel showed the presence of iron. We were unable to carry any of it away.

Three miles farther up the mouth of the Tonsena was passed. It showed a volume of water the cross section of which was about 30 by 3 feet.

Numerous channels necessitated almost continual wading, which was now seriously showing its ill effects on the party. Improper circulation of the blood and frequent discharge of urine at night was the cause of much sleeplessness. Ice froze in the cups to the thickness of half an inch during the night of May 20. The geese had begun to lay, however, and occasionally we could get one, with its eggs, of which there were never more than six.

Two miles above camp 14 we passed the mouth of the Gakona, so concealed by timbered land as not to be visible. The diminution in volume of the Copper after passing this point showed this to be no inconsiderable tributary. The bearing up it from near the junction is northwest. The positions of the various camps are shown on the accompanying maps.

Three miles below camp 15 we obtained 30 salmon from a deserted cache in such a condition that our dogs hesitated to eat them, yet hunger compelled us to do so. On the 22d we went into camp early in order to replenish our "larder" by hunting, but had little success. A smoke far in advance seemed to promise something cheerful, but soon we found that the natives, whose presence it indicated, were traveling north as well as ourselves. From their trail we knew they had no boat, hence our chance of overtaking them was very indifferent. The river again appeared in a single channel, an unusual sight on the Copper.

On the 23d, at camp 16, another effort was made to obtain large game. One party crossed the river toward the peaks on the east; the other hunted on the west bank. Neither of these obtained any game. The thoughts of all were now centered on the natives in advance whose smoke we had seen. From a high hill behind camp 16 a great stretch of country was visible. Huge snow-capped mountains to the north and west, evidently the principal range south of the Tanana River, were seen for the first time. The highest visible peak of the range, which bore north by east, I have called Mount Patten, in honor of Captain Patten, of the United States Quartermaster's Department, though I have been unable to definitely locate it on the map for want of other observations of it. It was supposed that this peak was seen several times after reaching the Tanana, but the bearings when plotted do not agree. The farthest visible water of the Copper River bore east northeast. Mounts Drum and Tillman bore respectively east 15° south and southeast.

On the 24th we passed the first natives seen since May 15. They were the thinnest, hungriest people I have ever beheld. The children were slowly wasting away. Their only support had been a few small fish, rabbits, and roots. Their supply of food on our arrival contained roots only, but the men were off for fish. We examined not only the caches, but the contents of

Mt. Drum, E. 10° S., 13,300 ft.

Mt. Wrangell, ESE., 17,500 ft.

Mt. Tillman, SE. by E., 16,600 ft.

AS SEEN FROM POINT 6 MILES ABOVE MOUTH OF GAKONA RIVER.

everything that might possibly contain food, with a view of satisfying our hunger, but to no purpose. This settlement was on a small tributary of the Copper, on the west bank. It was our intention to camp near them, but so pitiful was the sight that we marched 3 miles farther. Our condition was better than the natives—thanks to our guns and ammunition. I shudder to think of the subsequent condition of those poor women and children unless the salmon run quickly followed us.

The last 3 miles traveled were in the direction of northeast by east, and the river was 1½ miles wide. The water had risen to such a height that we were compelled in numerous places to cut the small timber, ordinarily a short distance from the water, to be able to cordell the boats. Our marches continued to grow shorter, in spite of strenuous efforts to prevent this.

From camp 18, a high mountain, Mount Sanford, above Mount Drum, was seen for the first time since leaving Liebigstag's. Its bearing was east 17° south, while Mount Drum bore southeast one-half south.

On the 26th the mouth of Sanford River, a torrent from the east, was passed.

From leaving one camp until making another, we were almost continually in the water, and a distance of 6 miles had now become a huge march, so difficult was the river and so worn the party. On the 27th we passed the mouth of the Schnuna River, a torrent from the west, and went into camp, not having traveled more than 4 miles. The river had many turns at this latitude. I have refrained from detailing its course, which is shown by the map.

The size of the boat we now found to be too great for the strength of the party, and larger than necessary to carry our all, so at camp 20 Sergeant Robertson and Bremner remodeled and reduced it. Camp was near a native house, though the only native we saw was a cripple, who wanted permission to accompany us, claiming that he was a skilly, and related to the big Tyone of the Upper Copper. From him we learned that there was a trail over the Alaskan Mountains, but it was kuteshít, kuteshít (far, far away). He was willing however to go, but to subsist him would be necessary. We rejected his services, and supposed that this would be the last of him. Not so, however, for he continued to follow along the woods, always appearing at meals, whenever we halted on the side of the river on which he was. After a while we found that he could be a valuable assistant by digging roots, and he was added to the party. He proved a genuine skilly, in fact a Mascot, without whose services we would undoubtedly have suffered much more than we did. Even rabbits were now difficult to obtain, and the little flour and rice kept back for moral effect were now used to appease our hunger.

The following is from Fickett's journal:

May 28.—Had a little paste, rotten and wormy meat for dinner; rotten goose eggs and a little rice for supper. Each meal about one-fourth of what we needed. We went into camp. Whole party played out.

May 29.—Party nearly played out for want of food. Can just crawl. Had to stop middle of p. m. to make a flapjack for each and a little beef tea. Decided to abandon boat at the next Indian house.

May 30.—Temperature of water 43. Course northeast by east. Arrived at an Indian house at 11 a. m. hungry. Decided to abandon boat. Indian gave us a dinner of boiled meat, from which he scraped the maggots by handfuls before cutting it up. It tasted good, maggots and all.

On the morning of May 28 we passed the mouth of the Chestochena. Its canyon for many miles bore north 20° west, while the Copper bore north 30° east. The two seemed nearly equal in size, and for some time I was in doubt as to which one to ascend. The cripple decided me by saying that there were no natives on the former, but there were some on the latter. The trail over the mountains was yet very indeterminate, the cripple having informed us that two moons would be required to make the portage. I thought perhaps a shorter route might be found from the head of the Chestochena, the mouth of which had several channels, separated by thick ice resting on the gravel bars.

A few miles above the junction of the rivers we reached a camp of natives, twenty-three in number, all ready to start for Taral for the fishing season. They did not contemplate a return until the following winter. Here the Copper was again in a single channel, and showed itself a much smaller river, its width being only about 100 yards.

On May 30, after a march of 3 miles, we reached a native settlement of four souls (camp 22), and found the natives above the Tazlená. Here we abandoned the baidárra to take a portage,

the chord of an arc represented by Copper River. At 7 miles from camp the bearing of Mount Sanford was south 5° east, and Mount Drum south 20° west. Noon observation showed us to be in latitude 62′ 54′ north.

The Tatlatán cripple took the trail, and we followed in single file, with packs on our backs. Our three dogs were utilized for the first time as pack animals, and were of much value. Our guide was crippled to the extent of having a shriveled leg, for which he substituted a long stick that passed behind the shoulder and above the head when adjusted to assist walking. The lower end of his staff was broadened to prevent its sinking into the sphagnum; his speed and endurance seemed wonderful. Our trail, on June 1, lay closer to the river, and 3 miles from camp 23 we crossed a clear stream of dimensions 30 feet wide by 1½ feet deep, which we knew to be a fish stream by the appearance of the camping ground upon its bank and the fish traps lying in and near the water. The house, usually found at such places, had been burnt, and no natives had stopped in the vicinity for many months.

On the banks of this stream, where the moss had been destroyed, was the luxuriant growth of grass that generally springs up near settlements. This fact may prove of value if it ever be considered prudent to attempt the cultivation of barley, or the hardy vegetables, in such high latitudes. The country over which we were traveling was covered with marshy lakes and a growth of dwarf spruces, both dead and alive, besides a fair quantity of cottonwoods. It differed in no material respect from the country of the Chettystone River, over which we portaged. The berry bushes (several varieties) were in bloom, and the foliage of the trees was nearly complete, indications that the salmon should be at hand.

Camp 24 was on the Copper River, which here has a course nearly due east and west. About 3 miles to the west of camp the Slahná River empties from the north. It is a tributary of considerable proportions, if we judge from the diminution of volume of the Copper above their confluence. From its source, Lake Mentásta, a trail also leads to the Tanana.

June 2 our course lay along the river, which now bore east-northeast, for several miles. Suddenly, to my surprise, the cripple began crossing some of its numerous channels. The bed of the river here is fully a mile wide, and there are probably ten channels, varying in depth, where we forded, from a few inches to 2½ feet. Between the channels are gravel and small bowlders, with an occasional island covered with willow. In fording these channels the party found it necessary, on account of the swiftness of the current, to join hands, thus proving of mutual assistance.

After crossing the river our course lay northeast for about 5 miles, over a well-worn trail, a pleasant sight to us. When within a mile or two of the Tyone's we passed a collection of snow-shoes and sleds placed in the branches of the trees. Why these articles should usually be stored at a distance from the house I was unable to learn, but such is the custom with all of the Copper River natives. The cripple had gone in advance to notify Batzulnéta, for such was the name of the chieftain, of our approach. The usual salute with guns was exchanged, and we were met by 31 men, 10 women, and 15 children, the latter, of course in the background. Of these natives, quite a number were from Tanana, and had gone into summer camp with Batzulnéta, to be ready for the run of salmon. That the Tananas should come to the Copper River to fish was very significant. Here there was but one winter house, and that occupied by the Tyone and his immediate following, while the other natives were living in spruce-bough houses. Batzulnéta, the largest native seen by us in the Territory, was 6 feet 4 inches high, and clad in a blouse of scarlet flannel, obtained from a trading station on the Yukon River, and a pair of native trousers, which included the foot gear. His shirt of cotton cloth, and a black woolen hat with strips of red flannel, completed his costume. His hair hung down his back in a tangled roll 3 feet long, showing no signs of ever having had any attention. As a medicine man, he could neither have it cut nor combed. Over each ear hung two small braids, secured at the ends by beads and sinew. Altogether he was the most picturesque character we had met, yet his face neither showed courage nor cunning. His ascendancy had doubtless arisen from his position as medicine man, possibly from a superstition concerning his unusual stature.

One of the natives from the Tanana made a map of the Yukon and Tanana, which is inserted

to show how great is the geographical knowledge of these primitive people. He assured me he had been to the stations on the Yukon, at Fort Reliance and at Fetutlin, the former kept by Mr. McQuisten, the latter by Mr. Harper, both of whom we afterwards met on the Yukon, below the mouth of the Tanana. He was entirely ignorant of their surnames but spoke of "Jock." These natives, likewise those on the head waters of the Tanana, call the Yukon River Niga To; the White River, Natsená; the Tanana, Nabesná; and by such names we spoke of them to the natives until we were two-thirds of the way down the Tanana.

At this camp we bade good-bye to Wahnie and Chetoza, both of whom were in a sad condition, due to the constant exposure and hardship. Each had contracted a severe cough, and both were very much reduced in flesh. Wahnie had become much attached to us, and wept at parting. Their services for the last few days had been of very little value. The usual meal was given us on our arrival, but after that food of any kind was difficult to obtain at any price

The natives were hourly expecting the salmon, and would frequently go to the small river near by and put in the dip net. Inspired by their hopes, June 3 was passed in waiting on a diet of half-rotten salmon and a few rabbits, the moose meat having been exhausted. During the afternoon of our arrival all the males (eight) from Lake Suslóta came to Batzulnéta's, and in the evening had a grand orgie.

At first we were told that it would require thirty days to cross the mountains, but after many wahwahs it was decided that with long marches the journey could be accomplished in seven. The first estimate was made on our arrival in a half-exhausted condition.

Four natives were employed to pack across the mountains for us, but not until the Tyone had been first rewarded, then the fathers of the young men, and, finally, a promise from us to pay the young men themselves for their services.

The natives here differed not a great deal from those of Taral. Their language, however, was not readily intelligible to our Lower River natives, one of whom I used as interpreter. In some cases their words were entirely different—for example, a long distance, by the Midnoóskies, was kuteshít; by the Tatlans, nijót (French j).

Just before leaving a series of loud shouts were heard, proclaiming the first salmon of the season. It was a rather small silver salmon, which was placed in a conspicuous place on one of the spruce-bough tepees, where all visited it with great singing and glee. Though aware that probably in a few days there would be hundreds of these, the promise of honnái meat (caribou) at Lake Suslóta induced us to move on. Moreover, I knew that at most only two or three days' rations of fresh fish could be carried.

The expedition left Batzulnéta's camp for Lake Suslóta, the source of a tributary of the Slahná River, on the 4th day of June. At 3 miles from camp the bearing of the pass over the mountains was north 30° east; bearing of the source of the Copper River, east 30° south. Almost the entire march to the lake was over a boggy flat, with têtes de femmes or hummocks, a liberal allowance of scrub birch, so small that it might readily be taken for gooseberry bushes, and a limited quantity of dwarf spruce. About noon it was extremely difficult to find enough wood to boil the tea. The gravel and bowlder bed so near the surface would prevent the growth of vegetation of any considerable size, even though there were no ice.

The mountains we were soon to cross were comparatively low, and pointed almost at right angles to the high mountains to our eastward and southward. The high mountains in question constitute the apex of the mountain system south of the Yukon, and from which spurs shoot in several directions. The head waters of the Tanana, Copper, and White rivers are contained in them. The location of the prominent peaks, viz, Sanford, Drum, Wrangell, Tillman, and Blackburn, by numerous compass bearings, do not tend to show the continuity of the range. Could a view have been obtained from one of these peaks, a backbone of the system might have been determined, showing the connection with the St. Elias Range, with the mountains that separate the Copper from the Tanana, and those between the Tanana and the White. The existence of high mountains behind and around Taral, and the high mountains north of Prince William Sound led me to believe that the St. Elias Range finds an extension at a rather uniform distance from the coast, and terminates south of the Kuskokwim. The mountains we were about

to cross could hardly be a continuation of the high mountains to the east, unless one be considered a spur of the other. The range, south of the middle part of the Tanana, contains some very high, snow-clad peaks.

We reached Lake Suslota, at the foot of the pass, where we found one house and three or four families, consisting of 8 men, 6 women, and 9 children. Their main sustenance was a dried fish, much smaller in size than the salmon. They were not fishing during our stay. In the lake, which was only 2 miles long and very narrow, could be seen small grayling, but they could not be induced to rise for anything we could offer them, no insects of any description being obtainable. From Suslota, Mount Sanford had a bearing of south-southwest and an angle of elevation of 4° 2′. It towered above all visible surroundings. The outlet of the lake, a tributary of the Slahna, flowed in a southwesterly direction.

For many days before reaching Lake Suslota we had sought a pass through the mountains on the right bank, which continued to grow lower as our northings increased. To be at the foot of such a one as would lead to the Tanana in so short a time seemed hardly credible, but such was the fact. To find two rivers of the magnitude of the Tanana and Copper heading so near each other as almost to have intersecting tributaries, and to be so entirely different in their characteristics, I consider one of the most interesting discoveries of the expedition. The barometer showed Camp Suslota to be 3,160 feet above the sea-level. The narrative of the Copper River ends with Suslota, the journey over the mountains being included in the narrative of the Tanana River.

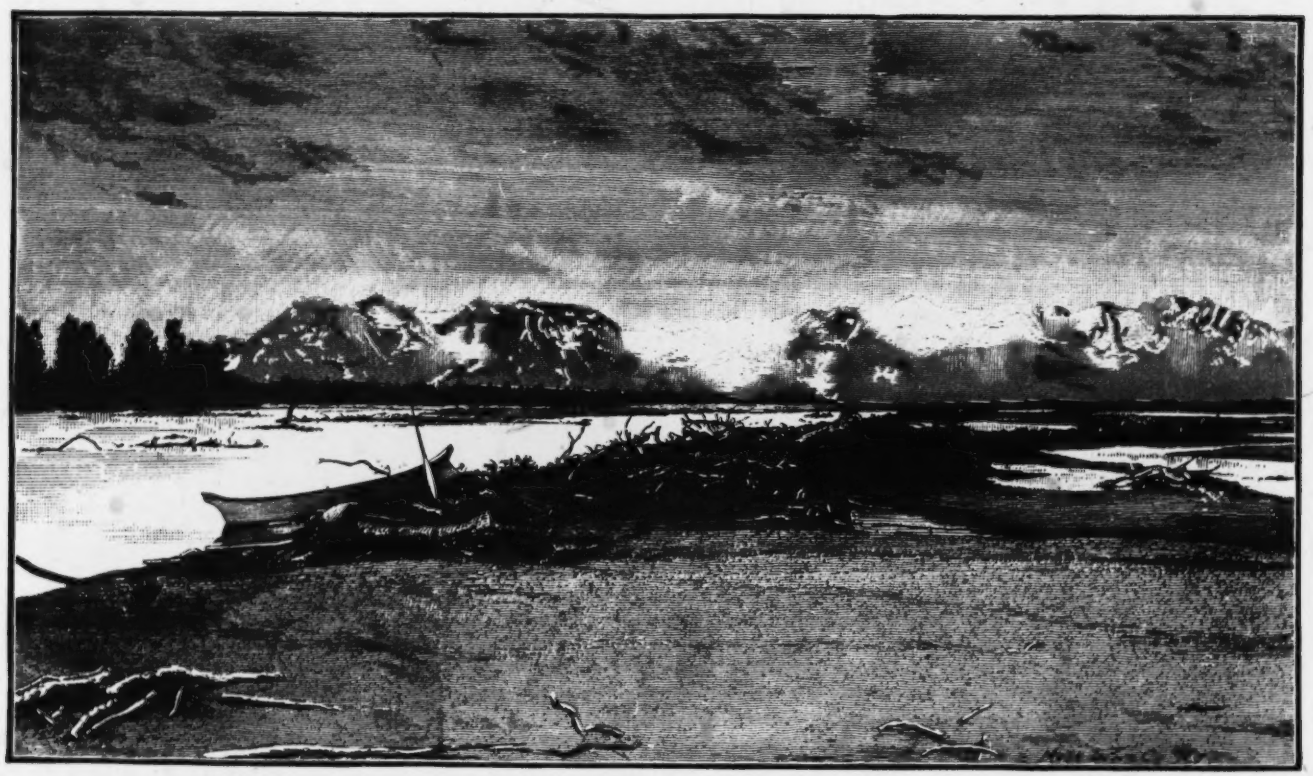
LAKE SUSLOTA TO TETLING'S.

I begin the narrative of the Tanana at the initial point of the pass over the Alaskan Range, Lake Suslota. This pass I have named in honor of Gen. N. A. Miles, United States Army. It is probably the best locality that will permit communication between the Yukon Basin and the Copper River country, and would doubtless be used should the minerals of the latter region prove of sufficient importance to justify such expenditures as this would necessitate. The possibility of the ascent of the Copper with provisions can hardly be entertained, unless it be made with sleds during the winter.

The route (Miles Pass) from the head waters of the Copper to the Upper Tanana, and the finding on both sides of natives who had been to the Yukon River to trade, settles the mooted question, "Do the Copper River natives visit the Yukon?" With regard to this matter the traders themselves were not confident, until a few questions were put, which brought forth the facts in the matter. Mr. McQuisten, trader of Fort Reliance, and Mr. La Due, a prospector, asserted that they had seen some Copper River natives at the post in 1883, and that a native on the north side of the mountains was used as a second interpreter to them. From this and other information I conclude that their visits are not frequent, and that traffic is effected usually by intermediate parties.

About noon of June 5, 1885, after engaging natives, taking observations for position and arranging the packs of all, including those of the dogs, we left the settlement, and soon began the ascent of the mountains, which were free from snow excepting the highest points and the ravines. The upper or northerly end of Lake Suslota was yet covered with ice and snow. As we slowly ascended the rather gradual slope, the Copper River basin appeared before our eyes, a beautiful sight. Looking south the lofty mountains on the east bank, the flat country on the west, with numerous small lakes, hedged in with evergreen timber, the river itself with numerous channels, made an impression long to be retained. On our left, while ascending, was visible the small tributary emptying into Suslota. Up it is a trail used by the natives in going to Lake Mentasta, the source of Slahna River.

After having reached an elevation of 1,000 feet above Suslota, in traveling about 3 miles, we found in our front a continuation of mountains, the highest of which was 1,000 feet above us, but which looked insignificant when compared with the lofty white masses to our south and east. From this elevation was pointed out to us by the natives the direction of Lake Mentasta, which was nearly due north; also a prominent pyramidal peak, toward which our course lay, and which bore north-northeast.



IN THE DELTA OF COPPER RIVER IN THE EARLY FALL.

After a march of about 7 miles we were near the foot of Mount "Tebay," pyramidal in shape and on a brook which feeds Lake Suslota. To our great surprise and delight the long-looked for salmon were endeavoring to ascend it. In some of the little channels the ice prevented further progress, in other places there was so little water that the fish, in endeavoring to push their way up on their sides, actually shoved themselves out of the brook onto the land. These were the advance guard that had doubtless passed through Suslota after our start in the morning. We had no difficulty in taking all we needed, nor was there any hesitancy about one and all eating until completely satisfied—a most unusual occurrence.

We had about three days' supply of meat on hand, which was about all we could carry, under the circumstances. I know this seems rather incredible, but not more so than the fact that any one of the party could easily eat 4 pounds of meat at a sitting. One of the party ate three salmon, including the heads of all and the roe of one from the time of going into camp until retiring. This camp (No. 1) was the only place between Nuchek and the Yukon River where it would have been possible to lie over and obtain food in sufficient quantity to satisfy our hunger; yet I did not deem it prudent to attempt to recuperate our strength on fish diet alone.

With one day's ration of salmon, and our moose meat, we left camp No. 1 and traveled northeast one-half north 5 miles, passing the little lake to which the salmon were making in order to deposit their spawn. I asked our natives whether these fish ever descended. They replied in the negative, thus in a measure corroborating the same views held by some of the natives of the Yukon.

One and a half miles farther brought us to a watershed between the Tanana and Copper, where, for the first time, was sighted the long-sought Tanana waters. At this place were many small lakes, separated by only a few hundred yards, some serving as reservoirs for the Tanana and others for the Copper. The natives informed me that Lake Mentasta had outlets flowing into both the Tanana and Copper. Should this not be strictly true, I am satisfied from the topography of the country that the head waters of Tok River are not more than a mile or two from the lake. This so-called watershed is in reality a pass, 800 to 1,500 feet lower than the mountains on each side, that are barren of everything save a little grass, spruce, and much moss. From it the course to Lake Mentasta is nearly due west.

On each side of us and converging as we advanced were two tributaries of Tok River, one of which was reported to head in Lake Mentasta, the other headed to the east and south. It would have been the most natural course to have followed this tributary to the Tanana, but our packers protested, saying we would starve. Our general course for the day was northeast, and our camp No. 2, below the junction of the two tributaries, was near the canyon through which the Tok River flows, and on its left bank, at a distance of 10 miles from camp. Then instead of following this stream to its confluence with the Tanana we crossed it a few miles below camp, and a mile or two farther on a tributary of it; then began ascending to another height, from which Tok River bore north-northwest. At 8.30 p. m. our course had now become due east, with another tributary of Tok River on our left flowing nearly due west. At 10.45 p. m. we went into camp 3, on the second watershed, where were numerous small lakes and other geographical features similar to those on the first. The term watershed must here be considered in a limited sense, inasmuch as the entire range would properly receive that term; and it must also be remembered that our course was nearer east than north. Observation on the 7th showed our latitude to be 63.11; on the 5th, at Suslota, 63.01.

Fatigue and heat prevented a start from camp 3 until 5 p. m., at which time the sun was far above the horizon. The course for 4 miles was east; then was begun the ascent of a tributary of a stream emptying into the Tanana to the east of the place where we first reached the river. The bearing for the next few miles was northeast until we reached a second tributary of the stream on our right just mentioned. From this the course was east-northeast up a gorge with much snow and ice, and temperature below freezing point.

At 1.30 a. m., after the steepest ascent made by the expedition, we were on a very short and narrow "divide," 4,500 feet above the sea level, with bold, barren bluffs on each side. From this the most grateful sight it has ever been my fortune to witness was presented. The

sun was rising, but not in the east; in fact, just two points east of north. We had nearly reached the "land of the midnight sun" to find in our front the "promised land." The views in advance and in rear were both grand, the former showing the extensive Tanana Valley with numerous lakes and the low, unbroken range of mountains between the Tanana and Yukon rivers. On this pass, with both white and yellow buttercups around me and snow within a few feet, I sat proud of the grand sight which no visitor save an Atnatana or Tanana had ever seen. Fatigue and hunger were for the time forgotten in the great joy at finding our greatest obstacles overcome. As many as 20 lakes were visible, some of which were north of the Tanana, more than 20 miles away. The bearing of the most easterly water was east 15° north. The bearing to Nandells, our immediate destination, was east 30° north. Had we ascended the craggy, rocky peak on our right, which obstructed the eastern view, we could probably have traced the Tanana many miles toward its source, but the greatest of all obstacles to exploration, hunger, prevented. The northern declivity was extremely abrupt, and our descent lay along a gorge similar to the one ascended, excepting the absence of ice and snow. A mile down this gorge, at the first obtainable timber, we halted and cooked the last Liebig's extract of beef that we had so carefully preserved for just such a contingency.

At 5 a. m. we went into camp 4, barely able to stand, to be harrassed by the gnats and mosquitoes. Our only protection was our blankets, which the extreme heat rendered most uncomfortable. We had succeeded by marching all night in making about 14 miles. We had crossed the Alaskan Mountains, represented in this section on all charts that attempt vertical delineations as very rugged and lofty, which is hardly the case. Not four weeks before our landing at San Francisco, a scout sent into Alaska the year preceding us had returned and reported that a crossing from the Copper to the Tanana would be utterly impossible; that a fair idea of the nature of the country could be obtained by placing one Mount Hood on another. His information was obtained from natives, and is not more inaccurate than is frequently obtained from the same source. The traders of the Yukon, who are supposed to be more familiar with the general topography of the interior than any other white men, believed the crossing to be next to impossible, and were more than surprised when we reached the Yukon River.

Camp 4, just over the range, was at an elevation of 3,300 feet, as shown by the barometer.

June 9 we began our tramp about 2 p. m., and having been informed by the natives that by marching all night we could reach Nandell's, we decided upon making an attempt to do so, provided we had no success at hunting. Two natives, sent in advance to shoot rabbits, were overtaken at 10 p. m. with one in their possession. This little animal was but a scanty exasperating taste for nine half-starved men. During the remainder of the march to Nandell's, so exhausted was the party that the slowest progress was barely possible.

Just before sighting the few houses at the settlement, we were on a hill two or three hundred feet above the lakes and could see that the chain to which they belong is very extensive. We had passed several small lakes, and had crossed a large brook, leaving it on our left. This last may have been a feeder of some of the lakes, but from its temperature I should judge that such is not the case. The general course was east 30° north, with many deviations.

At 3 a. m., June 10, the party was welcomed at Nandell's with a great firing of guns. Here there were 40 men, 28 women, and 18 children assembled to gaze at a sight never before seen. Many of the men of this locality, in fact most of them, had made the tour one or more times to the Yukon for trading purposes, yet some of the men and most of the women and children had never before seen a white man. Their clothing indicated more easy communication with a trading station than did that of the Atnatanas. We realized from their appearance that better times awaited us.

A few of the boys, to their great pride and our surprise, repeated with various degrees of accuracy, the letters of the alphabet. They had received instruction on the Yukon from Mr. Simms, the zealous missionary sent out from England. He was highly esteemed by the natives, who were much benefited by his worthy example and instruction. This most excellent gentleman passed his last moments on Porcupine or Rat River, in the year 1884.

Had the distance to Nandell's been 30 miles farther, and game equally scarce as on the trail traveled, the injury to the party from hunger would have been incalculable.

The settlement of which Nandell was autocrat consisted of four houses situated on a small, clear stream, which helped connect the chain of lakes. After crossing the mountains a most decided change of landscape was presented us. Vegetation was more rank, and the temperature of the lake water was so high as to make it very disagreeable to drink. It seems rather remarkable that the season should be far enough advanced (June 10) for the sun's heat to have caused the water to be not uncomfortable for bathing in these lakes. The water of the Yukon was very much colder in July, as was the water of the Tanana the last of June. In fact, the mouths of some of the tributaries of the Tanana were filled with ice as we passed them. Some of the lakes seemed to possess a great depth of water, though a more thorough investigation might have revealed otherwise. Possibly only the shallow and surface water is heated by the sun, which shines in that latitude, in June, about 21 hours per day. The psychrometer was stolen before the temperature of the water had been obtained, and our barometer was so injured as to be of no future use to us. These incidents came near being the cause of serious trouble. I knew well enough that the manifestation of any fear would place us completely in the power of the natives, to treat us as they should see fit. Efforts to recover the instrument, however, were of no avail, and we barely averted a struggle with these people.

The country in the vicinity of the lakes was covered with a luxuriant growth of grass, and countless roses were in bloom. The trails round about bore evidence of having been much used, and altogether a more civilized appearance had not been seen since leaving Nuchek. The houses were large, and constructed without the use of bark. The absence of the attached sweat room and of the "box" arrangement of the interior caused a marked difference in their appearance when compared with the typical Copper River house. To procure firewood even for cooking was not an easy task. The scarcity of timber showed that these grounds had been used many years. A very old native informed me that he had been born there; that during the winter wood was hauled on sleds from the hills; that Nandell had obtained his supremacy by plunging a knife into his rival, son of my informant; and that there were no salmon in the Tanana.

I learned that there was a trail from Lake Mentasta to Nandell's, and also to the Tanana; that there were two routes to Fort Reliance—one entirely by foot, the other by portage to a tributary of the White River, then down the same, the White, and the Yukon in a skin boat. The return trip was always by the former route.

The food of the natives at this season is chiefly fish, taken in this stream by means of a dip net which just fills the channel, made narrow by means of small spruce piles driven side by side. Here there were several kinds of them, including pickerel, suckers, grayling, and two varieties of whitefish. The "catch" in the single dip net supplied all, and from each fisherman Nandell exacted a royalty. Someone was on the fishing stand with net in hand day and night. At Nandell's was obtained the first pemmican that we had seen in the territory. Afterwards, however, some was obtained on a tributary of the Koyukuk.

The inhabitants around these lakes, including Tetling's following, were almost without exception suffering from severe coughs, and many showed unmistakable signs of pulmonary troubles.

From Nandell's, Lake Mentasta bore nearly due west. The canoes used here and at Kheeltat's are the smallest I have ever known, an average one being 13 to 15 feet long, 21 to 24 inches of beam, and 11 to 12 inches across the bottom, and very shallow.

At first a raft journey down the Tanana was contemplated, but the natives protested, saying that two moons would be required. Later developments showed conclusively that a raft would have been totally unfit to run rapids so strewn with timber in places that we could barely run our skin boat through. It was finally decided by a council that the Yukon (Niga To) could be reached in a skin boat in twenty days, but no Indians could be induced to assist us farther than to the next settlement, two days distant by the river from Tetling's.

Nandell's is in latitude 63° 21′, and approximate longitude 143° 28′. He had several

"medicine men" in his following, one of whom accompanied us as far as Tetling's, entreating us not to stop at Kheeltat's, saying that all of us would certainly be killed.

June 12 we left Nandell's for Tetling's, which bore north-northeast, and which is about 11 miles distant. The destruction of the natural carpeting of the earth by fire to kill the mosquitoes and gnats has caused a splendid growth of grass between the two points just named. The numerous lakes on each side of the trail, the meadow-like appearance of parts of the land between, with groves of cottonwood interspersed with birch, was sufficient to recall scenes of much lower latitudes. Around these lakes the country seemed more pastoral in its nature than in any part of the Territory. A yet more pleasing fact was that there were few mosquitoes or gnats to harass us.

TETLING'S TO KHEELTAT'S.

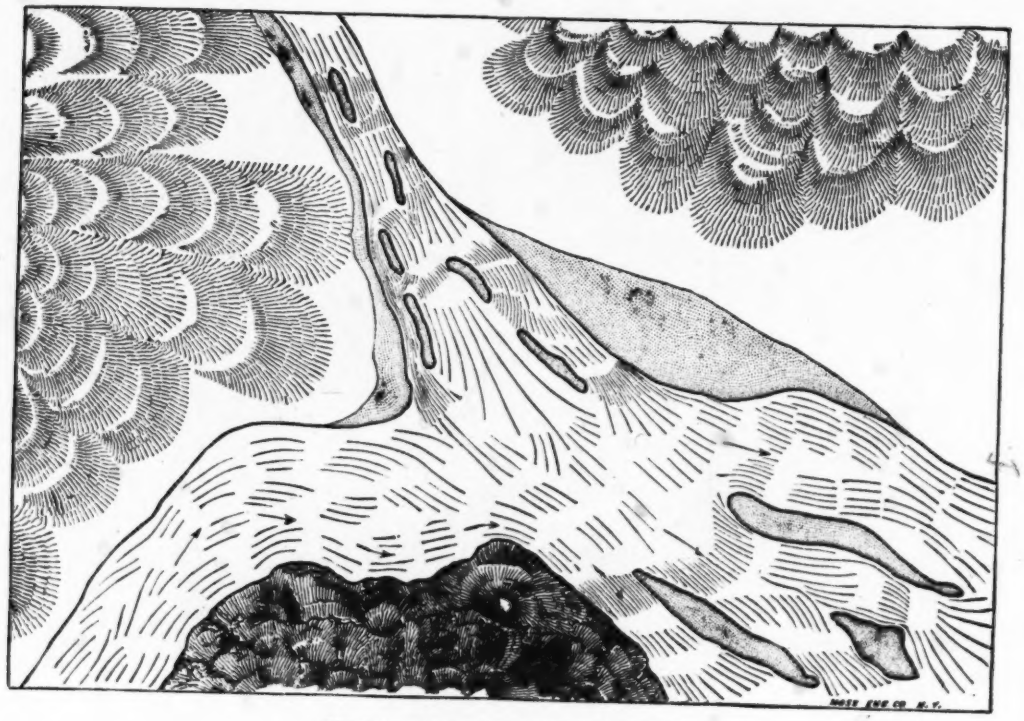
We reached Tetling's in the afternoon, and had the construction of the baidárra immediately begun—that is, if the word "immediately" can ever be properly used with regard to fulfillment of agreements by these people. Only three caribou skins could be obtained for it, one each from Nandell and Tetling, and one from quite a distance. At Tetling's were six men who had greeted us at Nandell's, four women, and seven children, occupying two houses situated on a deep, clear stream, the outlet of a lake much larger than any we had passed—so said the natives. To obtain the positions of the lakes in the vicinity would have required a much more accurate survey than it was possible for us to make.

Had there been food, I should have sent three of the party over the portage to the Yukon, and would have gone with the others to the source of the Tanana, which is indicated on the general chart in dotted lines. Insufficiency of food here as elsewhere was our greatest source of anxiety. The exhausted condition of the party caused me to start down the Tanana as soon as possible, vainly hoping that on reaching the Yukon our wants would be immediately supplied. We purchased all obtainable food at Nandell's and Tetling's, giving in exchange all the money that remained and every garment or article of any description that could be spared. The men of the party volunteered to give up everything in their possession, even to coats, shirts, pocket-knives, etc. We paid dearly for every pound of food, yet we left the natives in a hungry state, with their sole dependence on fish, which at that season were not abundant. The absence of salmon in the Tanana caused me to suspect falls or severe rapids in the river, but these natives denied that such was the case, though flatly refusing to go to the Yukon with us notwithstanding the greatest inducements.

At this place I noticed that the severe hardships to which Bremner had so long been exposed were affecting both his mental and physical constitution. His ankle, sprained on the Chettystone, had assumed an unusual size, which was due, as we found later, to scurvy. For two weeks past the body of Sergeant Robertson had been covered with black spots, which developed later into another form of scurvy. We had carried a bottle of acetic acid, the best antiscorbutic that could be obtained in Sitka and that could be transported. Its use was not effective, and I doubt whether any other acid would have been.

The baidárra having been completed, was launched by the native boys, given a trial trip, and found satisfactory. It did not differ materially from the one we had constructed and used on the Copper River. Instead of being constructed out of moose skins, those of the caribou were used, and it was by no means an easy task to secure even three in all that region.

With two natives, our three pack dogs, and a large supply of meat and fish we started down the stream at 6 a. m. on the 14th. There were six paddlers and one steersman. After a run of two and a half hours down Tetling River, with its many windings and general course of north by east, we reached the muddy Tanana, with its quicksands and boilings, sand spits, and absence of rocks. The current of the river was between 3 and 3½ miles per hour. Its water was covered with foam, which was not necessarily attributable to falls, new foam having been passed several times en route down. Spruce grew down to the very banks of the river. No attempt will be made in this narrative to detail the numerous courses; suffice it to say that the exact time on each course, as well as the course itself, were recorded, and the reduced results are shown on



TYPICAL HEAD OF TANANÁ RIVER RAPIDS.

NABESNATÁNAS—KHEELTAT, HIS SON, AND DESHADDY.

the accompanying maps. At 6 p. m. rocky banks on the north side were seen for the first time. The actual run on the Tanana was a distance of 35 miles.

Heavy smoke, caused by the extensive timber fires, obscured the sun the entire day, so that an observation was impossible. This smoke had originated from signal fires which were intended to give warning of our presence in the country. When we first arrived at Nandell's there was only an occasional smoke around, but as his guests departed for their different habitations each marked his trail by a signal fire. The prevailing wind was from the east and carried the smoke along with us. In answer to the fires on the south bank new ones were started on the north, so that for nearly two days we barely caught a glimpse of the sun except through the heavy spruce smoke.

Camp No. 7 was left at 5.45 a. m. to follow the many windings of the Tanana, which now varied from 100 to 300 yards in width. Most of the spruce timber growing along its banks was from 3 to 8 inches in diameter. At 8 o'clock the mouth of Tok River, which had much increased in size since our first sight of it, was passed on the left bank. It does not possess the torrent current of other tributaries farther down on the same side. In the forenoon the first gravel banks were seen. The mountains on the left bank were becoming closer to the river, and the "country rock" had become visible on both banks. Nearly all the islands in this part of the river are timber covered.

The signal smoke of Kheeltat, the bushy-headed Tyone, was sighted early in the middle of the afternoon, and at 6.30 we halted at some of his cache houses opposite the point on the left bank where the trail from Lake Mentasta reaches the Tanana. At this place, in accordance with my promise, I permitted the two natives to return to Nandell, which they intended to do by walking across the country. After a run down the river of 4 miles we halted for the night on the north bank, and about one-half mile above a tributary 30 yards wide with muddy water similar to the Tanana. During the day we had traveled on forty-one different courses, and the actual time (exclusive of halts) consumed was eleven hours and a half, the distance 45 miles.

After we had been in camp about an hour we heard the firing of guns, to which we responded. Shortly afterwards three natives appeared in camp. They were runners from Kheeltat, whose house they said was "kootel-stée," a short distance. This was the place that Nandell, Tetling, and their "medicine men" had so frequently implored me not to visit, but to silently pass by. Unwilling to pass through the country without knowing the disposition of the natives, and realizing that the danger incurred by the visit was scarcely greater than those we were accustomed to meet and would probably in the future encounter, I resolved to see the warlike Tyone. The traders of the Yukon informed us in July that they supposed Kheeltat would be hostile to any whites invading his territory. The runners had descended Kheeltat River in two small canoes, which they said could be utilized by us. At 11 p. m. Fickett and myself started for Kheeltat's, having been carried to the right bank of the tributary in the canoes, and having the youngest of the three natives for a guide. At 1.30 a. m., June 16, after a forced march over country showing no signs of a trail, we walked into the miserable looking house of Kheeltat, very much fatigued. The accompanying picture represents Kheeltat, the bushy-haired Tyone, his son, and a sub-Tyone, Deshaddy, who had preceded us from Nandell's to give information of our arrival.

It was taken when they were on a trading expedition to the Yukon, and consequently dressed in their finest. With less decoration and less modern clothes upon their persons it would be a fair picture of the Upper Tanana men. As we entered, a frown spread over Kheeltat's face and he would say nothing. The absence of the customary salute to welcome us was rather ominous, and his silence was yet more so.

Shortly after our arrival a few shots were fired, not in honor of us, but to assemble the clans; couriers were also dispatched for the same purpose.

Exhausted by working since 5 in the morning, Fickett and myself immediately fell asleep, to find on our awaking two hours later, 26 men and 4 squaws in the small house, all attired in their best. The chart was shown them and the object of my visit explained, all of which interested them but little. My reputation as a "medicine man" had preceded me, and when I produced my medicines, consisting of three kinds of pills, viz, quinine, and the usual Army

purgative and anti-purgative pills, I immediately commanded their attention. Nandell had informed me that there had been many deaths among these people, and as nearly as I could understand him he feared they might attribute them to our entrance into the country, and this may have been one of the causes of his warnings to us.

The same warm lakes, the same general appearance here as at Nandell's characterized the country. The consumptive look and its accompanying cough were more marked here than at the former place, and doubtless cod-liver oil would have been a more suitable prescription than anything in my medicine chest. The pills were given indiscriminately, but seemed to satisfy the natives. I must correct this; there was some discrimination, for the chief received one of each kind, a minor chief one each of two kinds, and a man or woman a single pill.

Efforts to get two natives to go a part or all of the way to the Yukon were of no avail. From them we learned that there were remarkable features in the Tanana River, either violent rapids or falls. They would point to the canoes, make gestures indicative of capsizing, at the same time spreading the fingers of the hand and imitating with the voice the roaring sound of the water. From Kheeltat's there is a portage over to the Yukon at Fetutlin, the station now occupied by Mr. Harper, which requires six days, one of which is by water. The bushy-haired chief and all his following went to the mouth of the stream (Kheeltat River) with us, the former taking me in the canoe with him. Like all the natives we had thus far met, they insisted on selling us their few furs, and seemed surprised that we were not traders. On parting with this reputed warlike chief, he promised to meet me on the upper Yukon in July, when the steamboat would have arrived, and said he would carry me a piece of caribou. My plans were afterwards changed, and I have not since seen him.

KHEELTAT'S TO NUKLUKYET.

At 7.20 a. m. we started again down the Tanana, much to the displeasure of the natives, who insisted on making an examination of our effects which they could vaguely see in our skin boat. We now counted 28 men, 18 women, and 6 children, probably nearly all of Kheeltat's following.

At 4 miles below we passed the mouth of a small, clear stream on the left bank, and 8 below we were at the foot of very lofty yellow granite bluffs in a state of rapid disintegration. From these "Cathedral Bluffs" the course for several miles was directly toward the mountains on the south bank. When at the very foot of the mountains the rushing of waters verified the statement of the natives, and we were indeed in rapids, whose course was nearly due west. For one-half hour we were running them, wondering every minute what a few rods farther would reveal. The high waves in places indicated the presence of large rocks in the channel. These rapids (Cathedral Rapids) mark the place where the river cuts through a small range of mountains. Below them the land on each side is lower and the course of the river is much more to the northward. The hills on the right bank strongly resemble those on the Hudson in the vicinity of Newburg.

Ten miles below the head of Cathedral Rapids appeared yet more majestic bluffs (Tower Bluffs) on the right, with a torrent stream on the left, whose delta mouth was embedded in a field of thick ice and snow. We were at the head of Tower Bluff Rapids. Ever afterwards the torrent stream on the left with bluffs on the right was a sure index of very rapid water.

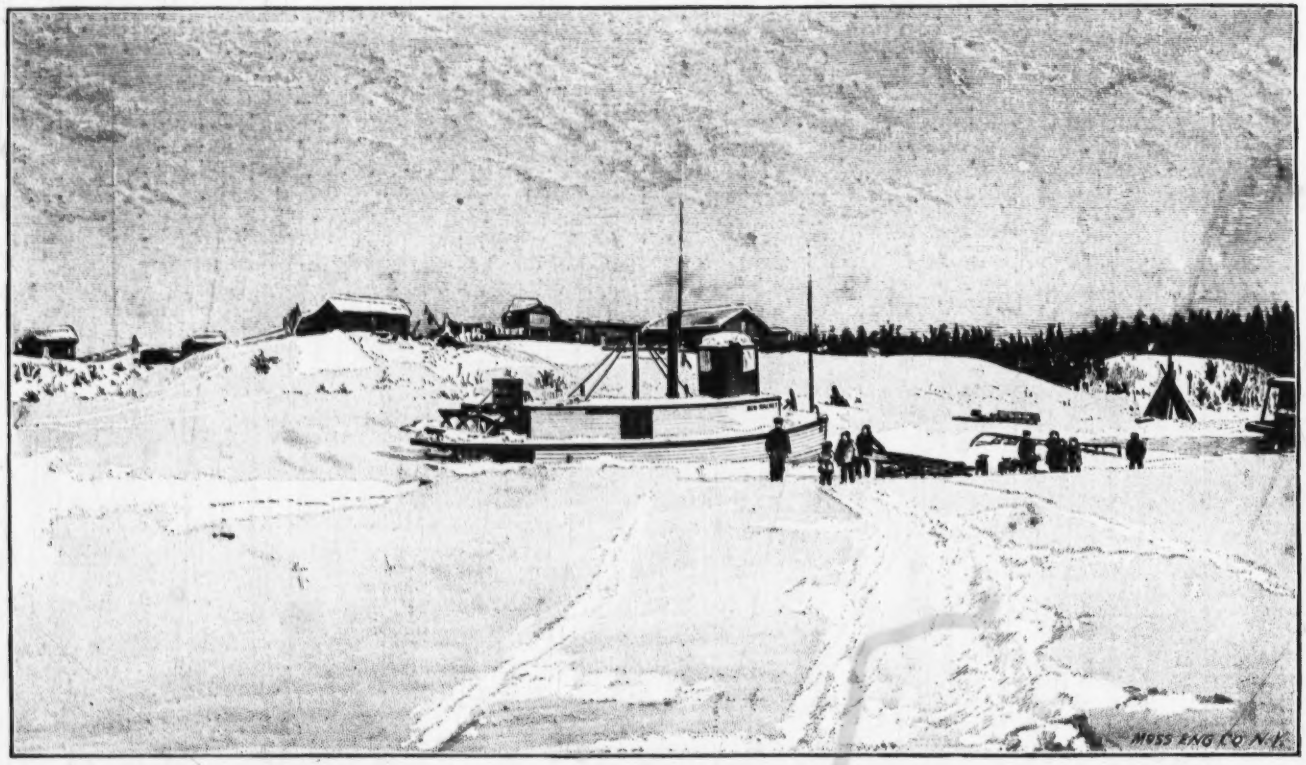
The ice at the mouth of the tributary, called by me Robertson River,[1] was the first ice seen on the Tanana side of the mountains. The gulch from which Robertson River flows bears west 20° south, and marks a decided break in the mountains to the westward. It also indicates the general course of the minor range, a cross section of which is included between the head of Cathedral Rapids and the head of Tower Bluff Rapids, through which the river had cut.

Just below Robertson River the Tanana spreads its muddy water in several channels, which in turn are divided until in places we had a striking picture of Copper River.

After running in these rapids for 8 miles the current slackened to 6 miles per hour for a mile or two, when we were again in rapids not surpassed by those just run. The upper part of

[1] After a member of the party of same name.

NUKLÚKYET—A SUMMER PICTURE.



NUKLÛKYET—A WINTER PICTURE.

the rapids caused me to consider steamboat navigation doubtful, but with respect to those 15 miles below there could be no doubt. The river was so divided into channels that it was with difficulty we could keep our small craft from running aground on the pebbly bottom. We were occasionally aground, when probably to our right or left, within a few hundred feet, was deep water. Once in a channel there was no halting unless run aground.

In places the river bed attained a width of a mile to a mile and a quarter, and contained fields of lodged timber with roots turned to the current. Some of this timber gave evidence of having but recently been washed away from the place of its growth, the roots filled in with soil still fresh. Other of it, having been barked, and having lost the small boughs, showed that it was lodged prior to the breaking of the ice. Still other, from its well-seasoned appearance, showed that it had been lodged many years. These trees are known to Alaskan pioneers as sweepers, as are those which have the roots fast to the banks, with the trunks and boughs in the water. Besides these were huge piles of drift timber lodged in the gravel islands. The lodging of trees is continually creating new islands and hence new channels; the river is constantly and rapidly cutting away banks, and new ones are being formed. High banks were seen which are so recent as to be covered with a growth of very small shrubbery only, while several feet below the surface may be seen the roots and trunks of larger trees, evidently not *in situ*. At the present time the wearing of the left bank seems to far exceed that of the right, as evidenced by the distance of the river in several places from bluffs on the north side, at the foot of which it rather recently flowed, and by the new channels through the timbered soil on the south side.

At 5 p. m. a halt was made for an observation for longitude and to measure the current. The latter, though decidedly less rapid than in many places during the day, was 6 miles per hour. We went into camp at 8 p. m., just below a small tributary on the north side, having worked ten hours in the boat, most of which was in rapids. The mountains on the left were showing themselves farther from the river and much higher.

Camp 9 was left at 6 a. m. to follow the river, now more nearly confined to a single channel. Just below camp were high bluffs on the right and a small stream on the left. Ten miles below camp the river and mountains on the south bank, with high, rocky bluffs on the north side, were undoubted indications that other rapids were at hand.

I was loath to believe that the Tanana would not be a navigable river, but Tower Bluff Rapids emphatically settles the question, as do Carlisle Rapids, which begin with Johnson River.[1] This latter stream is in all respects similar to Robertson River, and also marks a decided break in the mountains on the south bank. The high bluffs on the right bank are contemporaneous with those farther up. Several compass observations gave a position for Mount Kimball, a prominent snow-covered peak, but not so lofty as the peaks farther to the west and south, seen later. Johnson River is very swift, with abundance of ice in its wide bed, and is nearly as large as Robertson River, whose volume probably does not exceed 30 by 3 feet.

After nine hours in the boat, during nearly all of which time we were in rapids, we went into camp No. 10, well tired by the exertions made in avoiding shoals, stringers, and drift piles. For an hour during the afternoon so dangerous were the rapids that the steering paddle could not be dropped even sufficiently long to permit a compass observation.

In order to get a noon observation for latitude, we did not leave camp 10, June 18, until 1 p. m., when we began "shooting" channels filled in with timber so recently from the banks that the sod around the roots was in many places undisturbed. Eight miles farther down were hundreds of trees lodged in the channels and along the banks.

About 15 miles below camp 10 a swift and muddy stream in a single channel empties from the south. This tributary of the Tanana I have called Gerstle River.[2] It is about 50 feet wide and seems very deep. It marks the end of the rapids, below which the current is about 4 to 5 miles per hour.

Four miles below Gerstle River, Goodpaster River, one of the largest tributaries, empties

[1] Named after a member of the party.

[2] Having no natives with us and finding none along this part of the Tanana, we were unable to assign native names to the tributaries.

from the north, is 25 yards wide, and has a very swift current, with water similar to the Tanana. At its junction was a deserted fishing station and canoes, the only sign of natives seen since leaving Kheeltat's. This river was described by Kheeltat as having houses on it, and large fish in it, which I presume meant salmon. It is probably the limit of the salmon run. It is not strange that there are no inhabitants along that part of the river just described; such a current would forbid any sort of navigation and would make an undesirable home for even a Tananan.

The smallness of the tributaries of the Tanana is one of its special characteristics. Five miles below this tributary the land near the river on both sides is flat, with a very limited quantity of timber, most of which is dwarf birch. The banks are covered with moss and grass. The lowness of the country caused us to suspect that the Yukon was near, but we were mistaken then and several times later. The only game we had thus far seen on the river, besides one porcupine and one gray wolf, was an occasional lynx or rabbit, more seldom a pair of geese.

Camp 11 was made in a rain storm, to secure protection against which we sought the densest cottonwood timber, which by this time we had learned to fell and so place as to give the greatest protection. Sometimes, however, the greater part of the night was passed in a pool of water, efforts to better our situation being of no avail. With the exception of a few days on the Chettystone River, we had worn our clothes day and night since March 20. That this, as well as the scanty quantity and unusual quality of food, together with the exposure, assisted in sowing the seeds of scurvy there can be no doubt.

On the morning of June 19 we left camp 11. Five miles below, a small stream on the left, with a single vacated house at its mouth, was passed. Just below it is the only place where the river attains as small a width as 80 yards, yet the current at this place (Mason Narrows) is not more than five miles per hour.

Four miles below Mason Narrows, Volkmar River, the first tributary in size, empties on the north side. This, too, was a muddy stream, with a rather sluggish current. It was also described to us by Kheeltat as a fish stream. There were no signs of habitation at its junction save the ashes of a camp fire, though four miles below, on the opposite bank, were three houses, one of which was probably used as a winter home. All were unoccupied. Here were graves covered with cotton cloth; the first monuments of this type we had seen. This method of marking the graves is very common on the Yukon.

Four miles below Goodpaster River is a mountain torrent on the left bank, high cliffs on the right, and the head of Bate Rapids. As soon as we arrived opposite the bluffs the swiftness of the current was recognized. The river, which just above is in a single channel, spreads until in places it is 1½ miles wide. Fifteen to 20 miles below the head of these rapids there are so many channels that we with difficulty found sufficient water to float our skin boat. The current all day, with the exception of a few miles above these rapids, had an average rate of 5½ to 6 miles per hour. At 6 p. m. we went into camp 12, having paddled ten and a quarter hours.

Two miles below camp on the left bank a small torrent washes through the timbered woods. It possesses a delta mouth to an exaggerated degree, all filled in with spruce timber. A few hundred yards below it were seen in tents the only natives since leaving Kheeltat's. There were two women and one girl in the party, the men of it being absent for food. These were also the first natives who spoke of the river by the name Tanana. Above this part it is known as Nabesna River. Their fishing stand was erected and dip net at hand, but the salmon had not yet arrived; hence a hungry appearance prevailed. Half a mile below there were two fair-looking, but unoccupied houses.

During the afternoon of the 20th, below camp 12, large masses of driftwood and sunken soil, with its vegetation partly submerged, were passed; yet farther down the river seemed to have no bounds, having attained a width, as best we could estimate, of from 3 to 4 miles. After nine and a quarter hours of paddling camp 13 was made.

This was left at 3 a. m. the following morning, June 21. Twenty miles below camp the current is more nearly confined to a single channel and is very much less rapid. On the last part of the run the current was about 3 to 3½ miles per hour. Two small streams (one on each side,

SKETCH OF MOUNTAINS SOUTH OF TANANA RIVER, FROM A POINT 9 MILES ABOVE THE MOUTH OF VOLKMAR RIVER.

IVAN, A NUKLUKTÁNA TYONE.

as shown on the map) were passed during the day, as well as several fishing stations, none of which were occupied. Our rations of meat and fish had been consumed, and we were living entirely on the fat and tallow that had been reserved to fry fresh fish in, should it be obtained. After thirteen and a half hours on the water we made camp below the largest house seen on the Tanana, but which had, from its appearance, not been used for several seasons. There were two flag poles and several large birch canoes lying near. It is possible that these people, like the Midnooskies, burn or desert the house upon the death of its master. I know no other assignable cause why this house should not have been occupied the previous season.

One mile below camp 14 a small stream was passed on the left; 10 miles below and on the same side, a somewhat large stream of clear water. Living on tallow only, without any chance of obtaining even rabbits, was not conducive to cheerfulness of mind, though we were running downstream. After eight hours on the water we were surprised to find two small tents on the north bank. All hands paddled with renewed energy toward them, to the consternation of the occupants, who, with guns in hand, rushed to the brush. An old man, a woman, and two children remained. From them we obtained forty-two small white dried fish, to be served with the tallow or grease. The weather had become very warm for a few hours during the middle of the days and our diet correspondingly disagreeable. The current of the river during the day varied from 3 to 5 five miles and was generally confined to a single channel.

At 9 p. m., having paddled fourteen hours, we halted on a sandspit in the middle of the river to avoid the mosquitoes, which had now become a great pest. The distance traveled could scarcely be less than 55 miles. During the day several unoccupied fishing stations were passed. The absence of the mountains on the left was marked.

From camp 15 to the mouth of the Toclat River the current varies from 3½ to 4 miles per hour, and the river is confined to a single channel, excepting where an occasional wooded island divides it. No mountains are visible on either side. During the run of the 23d (12 hours) no sign of a house was seen, nor was there any on the 24th until the Toclat River was reached.

This river is about 20 to 25 yards wide at its mouth, and is partly the means of communication between the natives of the lower Tanana and the upper Kuskokwim, the second river in size in Alaska. Toclat in the native tongue means dishwater. On its right bank are two summer-houses, and on its left nine, an excellent proof that it is a good river for fishing purposes. It may be well to state here that if the exploration of the upper waters of the Kuskokwim is contemplated, the portage from the Toclat would be the most feasible route. The lower waters of the Kuskokwim were explored by the Russians many years ago, and more recently by Messrs. Petroff and Williams, but its upper waters are yet unknown to white man. The Toclat flows along the foot of a minor range of mountains on its left bank, whose bearing is northeast and southwest.

Two miles below it a camp of natives en route up the Tanana was reached. These had on hand a little meat and plenty of fresh king salmon, the first of the season. Our condition had already become serious, and had we not obtained food when we did from these natives we would have been in a most sad state on reaching the Yukon. Had we started down the Tanana two weeks earlier the probabilities are that we would not have seen a single native on the river. It must be remembered that Nandell's, Tetling's, and Kheeltat's people live on small streams away from the river, as do probably all the inhabitants during the springtime.

The camp of natives we had just passed was the following of Ivan, the most influential tyone of the lower Tanana.

Their appearance in camp, at the very edge of the water, with 35 to 40 birch canoes of all sizes fastened to the shore, the abundance of the rich-colored king salmon, split and hung up over the water, out of reach of the numerous dogs that had gone hungry most of the winter, was picturesque in the extreme. Their surroundings were luxurious when compared to ours. It seemed as though we had never seen bedding look so clean and comfortable, or the colors of calico so fresh. They were indeed cleanly when compared to us. We felt sure that we must be near the place whence their merchandise had come, and where plenty awaited us. Ivan's following consisted of 35 men, 20 women, and 20 children.

About 20 miles below Toclat River is the log house once used by Mr. Harper as a trading station, also the scene of Mrs. Bean's murder while her husband was a fur trader there.

Several miles above, the river follows along the foot of slaty bluffs, which show the last range through which the Tanana cuts. After passing them it becomes very wide and sluggish, with sometimes several channels. The volume of water is very great, as proved by the 20-foot sounding above Toclat River, where the river is 1,000 yards. The run of the 24th was 10 hours in a current not greater than 3½ miles per hour.

On the 25th we left the last camp on the Tanana, and after 8½ hours on the water were at the Yukon, a fact we did not recognize until informed by a woman, who halted us 2 miles below the junction by firing a gun.

We had supposed there was a place called Nuklukyet (Nuklukahyet, Nuclucayette), as shown on the most recent map, at the junction of the Yukon and Tanana. It is merely the ground where the natives formerly assembled for trading purposes. Where we halted were 2 women and 3 children, who informed us that Nukilerai was below, Nuklukyet above. Nukilerai is the name by which the natives know the trading station. Having obtained a canoe, Pete and myself, with one of the women as guide, went back to the junction, to find not even a fishing station. Furthermore, the woman, in her Russo-Yukon dialect, informed us, much to our chagrin, that "Nukilerai, kooshat natoo, chai natoo," which meant that there was no food or tea at the trading station below. It was too true. We immediately set out for this place, which will in the future be called Nuklukyet, in accordance with the name now applied to it by the traders of the river.

We arrived at 2.30 a. m., where we received a cordial welcome from the half-breed, Andrew (Androsky), left in charge. The subsistence stores at the station consisted of about 3 dozen hard crackers, 3 quarts of beans, 20 pounds of flour, a little salt, and some machine oil. The steamboats *Yukon*, owned by the Alaska Commercial Company, and *New Racket*, owned by Messrs. Harper, McQuisten Mayo, traders, were vainly expected up the river from St. Michael in 10 or 12 days; during their absence we must live on fish fried in machine oil.

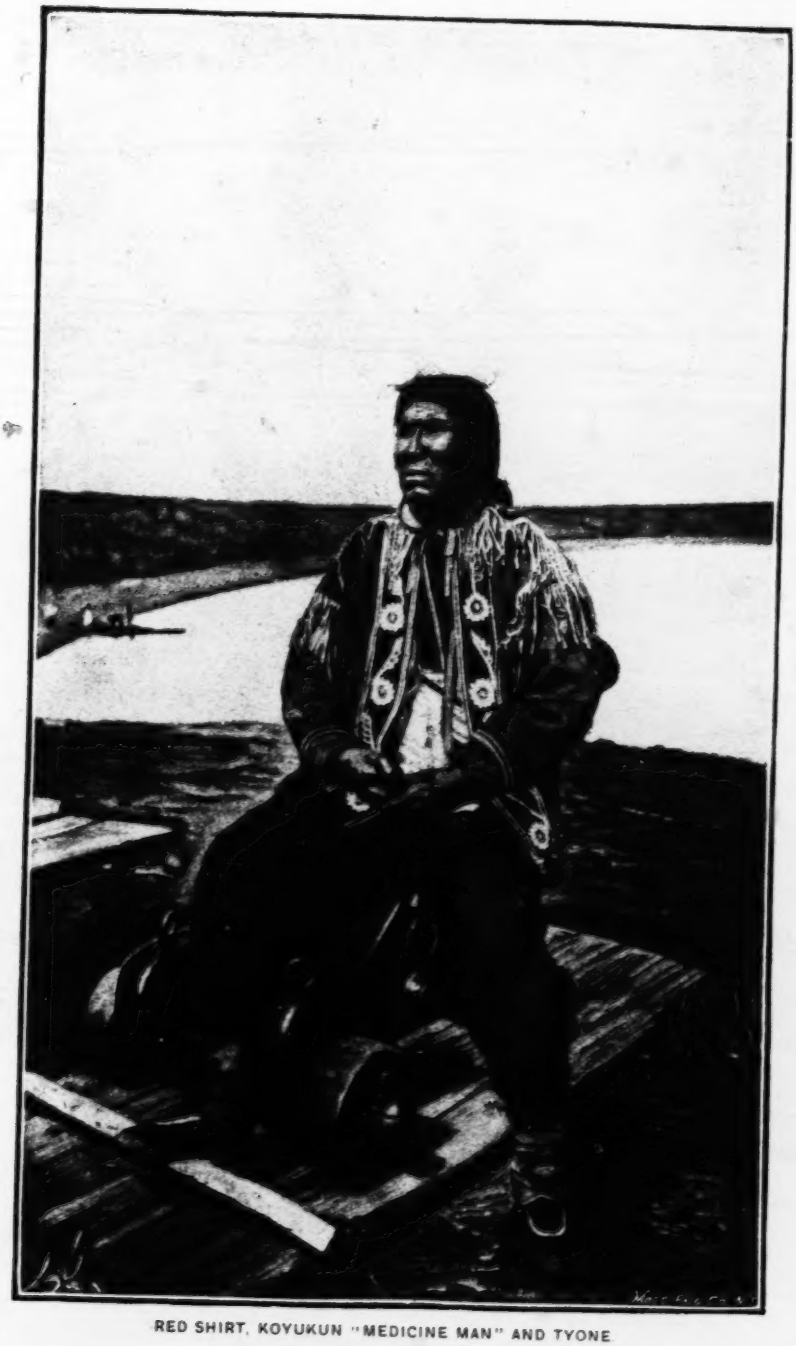
Fortunately the morning of our arrival 2 miners, who had wintered on the Yukon, Messrs. La Due and Franklin, arrived from the Upper Yukon with about 75 pounds of flour, 50 of which they kindly let us have. This lasted 4 days, though used very economically.

NUKLUKYET TO NULATO AND RETURN.

On arriving at Nuklukyet steps were at once taken to rate our watch and to determine our position. A few days later the watch stopped on account of the butt of regulator having slipped off the hair spring and out of its normal position. This having been replaced, rating was again attempted in spite of cloudy and rainy weather. On such expeditions at least three members of the party should be provided with pocket chronometers or best-grade watches.

While stopping at Nuklukyet we depended on fish for nourishment until after the arrival of the steamboats. The run of the king salmon was almost ended. After them came the dog, then the silver, then the hump-back salmons, and with all a few whitefish. It must not be inferred from this that all of the kinds of salmon could not be taken on the same day, but that the advance guard of each arrive in the order named.

The natives from Tanana, Fort Yukon, and the Koyukuk began to arrive by the last of June on their usual trading and pleasure expeditions. On July 4 the station was indeed thronged with natives, all of whom were disposed to be sociable and to help to share our small apartments. Once divested of its novelty their society was not to be envied. They indulged in jumping, wrestling, and a game of ball peculiar to themselves. To show their patriotism a grand firing of guns announced July 4, a flag was immediately run up the newly made pole, and a general shouting and dancing indulged in. In their zeal they had begun their salute before midnight of July 3. At noon we fired a national salute; and in the evening was a general dance, followed by special native dances. The arrival of an old man from the settlement a few miles above was the occasion of an explanation and apology from me for having broken into his caches. When told that hunger had been the cause and that a reparation would be made on the arrival of the steamboats, he replied that his people would do the same when hungry, and left satisfied.



RED SHIRT, KOYUKUN "MEDICINE MAN" AND TYONE.

Taken at St. Michael on a Russian howitzer.

NOWIKÁKAT IN WINTER, SHOWING DOGS AND SLED.

Saturday, July 11, with Joseph La Due and the tyone's son, I left Nuklukyet to meet the steamboat, which was daily expected. That portion of the Yukon traveled during this canoe voyage has been run in with the compass observations taken by me, and differs but little from the same on the chart prepared by Captain Raymond, 1869. Our first camp was at the trading station 2½ miles above the Nowikakat River and on the north bank. The agent, Mr. Cochrein, a Russian, like all the traders of the river, was at St. Michael, or rather on the way up the river from that base of supplies. The picture represents the station in winter.

We had passed the Melozikakat River, the largest tributary entering from the north between the Tanana and Koyukuk Rivers. La Due prospected on it for about 75 miles. It may be well to state here that I did not keep a record of all the islands passed on the river, as I did later on the Koyukuk, because I assumed this had been previously done. The river has frequent wooded islands, but they are not so numerous that they could not be approximately located in such a running survey.

The Nowikakat, claimed by some to be 400 miles long, is the largest tributary of the Yukon, excepting the Tanana and White rivers, entering it on the south side. There have been some mining claims located on it by Mr. Cochrein. It is a stream of considerable proportions and should be mapped, though, judging from the topography of the country, I do not think its length can exceed 250 miles. It would be navigable quite a distance with a small steam launch. Native settlements are frequent along this portion of the river. We passed daily 3 to 5, each of which contained 12 to 20 souls. From some of these we obtained a few berries or young ducks, or perhaps a handful of flour, all of which, with the activity necessitated by traveling, probably saved me from the scurvy and other sickness, with which the party was suffering at Nuklukyet. For the food obtained along the route I could only promise payment on the arrival of the steamboat, which we were continually looking forward to. The farther we descended the river the more fish we found, but in other respects the more poverty-stricken the natives. This is explained by the scarcity of game, consequently the fewness of skins with which to clothe themselves and to barter for white man's clothing materials and household conveniences.

On the night of July 14 we landed at Nulato, after a run of 201 miles. There are three Nulatos, viz, Lower, Middle, and Upper. The former was used as a station during the Russian rule, but after having been burned, Upper Nulato, where we stopped, was chosen and used until abandoned this year. The middle settlement is on the small stream which empties half a mile above the lower village and one mile below the upper. It was the post of the so-called "opposition company," and used by that corporation until its retirement from the country. Nearly all the natives of Yukon, certainly all that can afford it, use tents during the summer time. They possess the advantage of portability and are more effective than the summer houses in keeping out mosquitoes. I have, however, occasionally seen mosquito bars swung in a tent.

The delay at Nulato was very exasperating, so as soon as we heard that the *New Racket* had stopped below, somewhere near Kaltag's, we set out in the face of a strong wind. Our canoe frequently dipped water and our headway was slow. This run of 30 miles caused us more work than one twice the distance would have done under favorable circumstances. We reached the *New Racket* at 8 p. m., and were joined by the *Yukon* about midnight, when we started up the river. The former boat had miners' supplies aboard, destined for Fetutlin and Fort Reliance, which it carried for the first time; the latter the usual supplies for the natives.

The Alaska Commercial Company, whose base of supplies for the Yukon River region is St. Michael, furnishes the traders their merchandise at 25 per cent above San Francisco prices, and charges a fixed amount for their transportation up the river. The traders in turn agree to transfer to the company all the furs they obtain at prices which probably do not exceed one-half their value in the San Francisco market. The stations of the different agents are changed as the manager at St. Michael sees fit. The station at Anvik was abandoned on this trip, though a few supplies were left with the trader's wife, a half-breed woman. Nulato was to be abandoned, and through fear lest the natives, incensed at the idea, would offer resistance to the passage of the steamboats, it was decided that both should reach there at the same time; hence the delay of the *New Racket* to await the *Yukon*. Upon our arrival the natives were furious at

the intentions of the agent, and made some very ugly threats toward the ex-trader, who was finally persuaded, through fear or policy, to leave some supplies with a man, thus making Nulato a subpost of Nuklukyet. The chief agitators here were two half-breeds, Demoósky and Antoósky, who had acted at different times as interpreters to Russian or American traders, and who, knowing the exorbitant prices charged them for their goods, had informed the natives. These became so hostile to the trader that he was unwilling to remain another year. They had not realized that their antagonism might be the cause of the loss of their station until a day or two prior to the arrival of the steamboats.

There were to be but three stations on the Yukon, viz: Fort Reliance, in charge of Messrs. McQuisten and Mayo; Fetutlin, in charge of Mr. Harper; Nuklukyet, in charge of Messrs. Walker and Fredericksen. These traders have been in the country sufficiently long to know the treatment best adapted to keep the natives friendly disposed; but should the natives become a little more enlightened, as are the half-breeds above mentioned, which they will be as soon as the country is entered by miners and other parties, rebellion against the traders will certainly follow unless better terms be granted by them. The want of clothing by the natives of the Lower Yukon, where skins are scarce, is already the cause of much suffering.

From Nulato to Nuklukyet there was continuous rain, and the Yukon water was nearly as muddy as that of the Tanana when we descended it. Several stops were made for the purpose of taking on wood, and once, at Nowikakat Station, to unload the merchandise destined for it. The illustration represents the natives felling the dead timbers to be used by the steamboats. It is very interesting to watch the natives engaged in an industry comparatively new in their history, and to observe the skill that some of them display. Those living nearest the coast are considered the best laborers, while the value of those farther up is inversely proportional to the distance from the sea. On reaching Nuklukyet, July 26, I found to my surprise Sergeant Robertson and John in a critical condition from scurvy, and Fickett and Pete looking as though suffering from a severe sickness. The continual fish diet had become nauseating to them and was working disaster by complicating diseases. It was gratifying to see how rapidly the party began to recuperate on wholesome food.

Until the steamboats passed on up the river there was a general uproar, the natives shouting with pleasure one hour, the next threatening the extermination of the whites on the Yukon. Men that had agreed to go with me to the Koyukuk now deserted me. The Koyukuks, who were so anxious at first to have me go and to assist me, refused all connection with the undertaking. While at Nuklukyet I had several conversations with the principal natives through interpreters. They expressed a desire to have schools among them and industries that would give occupation to the young men whereby they could earn money. These expressions I recalled to the quasi chief, "Spot," when his following refused to accompany me to the Koyukuk. It was not entirely without effect; yet I must give each $1 per day and his food, also canoes for transportation of all from Nulato back to Nuklukyet.

Having purchased the necessary supplies, I supposed the start for the Koyukuk could be made without the usual inconveniences incident to the beginning of journeys with Indians. Not so, however; for on the morning of July 28, when ready to move, I found that all but the three smallest Koyukuks had left Nuklukyet during the night and that the four Yukon River natives declined to go.

After considerable delay the necessary number of Indians was obtained, and also two large dogs in addition to the three that had been packed across Miles Pass. Fickett was the only one of the original party to accompany me. John Bremner and Peder Johnson chose to remain on the Yukon to continue prospecting during the remainder of the summer. They contemplated leaving the country the following year, either by the headwaters of Yukon and over Schwatka Pass to Chilcat, or else by the mouth of the Yukon to St. Michael, and trust to the kindness of the commanding officer of the revenue cutter for transportation to the States. Sergeant Robertson was to go to St. Michael on the return trip of the steamboat *Yukon*, which was to wait at Nulato for Fickett and myself until August 23.

FELLING TIMBER FOR THE YUKON STEAMBOATS.

WINTER COSTUMES.

There were two ways of reaching the Koyukuk River that were feasible: one up the Tozikakat in canoes to near its head, thence by a short portage to the Konootena, a tributary of Koyukuk, and down it to that river; the other by descending the Yukon about six miles, thence by portage nearly north by east across the Yukon Mountains of the present charts to the Konootena River, and by descending it as above. When the journey is made during winter, a still different trail is used, starting due north from Nuklukyet, If the Tozikakat route be traveled it can be reached in canoes via the Yukon, or by a portage to it from Nuklukyet, the canoes being carried. While at Nuklukyet I sent out a party of natives to hunt bear on the Tozikakat, and they reached it in the latter manner.

Inasmuch as the Kóyukuks themselves had used the second-named route, I decided upon it. One of the barges that had formed part of the tow of the steamboat *Yukon* was left in charge of Mr. Cochrein, to be taken as far as Nowikakat, and in this transportation was obtained to the point of departure on the Yukon River, 6 miles below. I now had 7 natives and 5 dogs packed with food, the average pack of the native being 50 pounds, that of the dog 25. Fickett and myself were in light marching order, carrying only our instruments and weapons. The bedding for both of us consisted of a piece of water-proof linen, the remnant of a sleeping-bag used on the Copper River, and a single blanket.

The description of the hordes of mosquitoes described by Lieutenant Schwatka as existing on the Lower Yukon is not only applicable to those of that part of the Territory, but also to those of the country north of it, even to beyond the Arctic Circle.

Our start for the Koyukuk was just at the zenith of the "sand fly" season. Why this gnat, which exists where there is not now nor ever was any sand, should be so called, I can only attribute to the astuteness of the pioneers. Some consider them a worse pest than the mosquitoes. There are at least two varieties, differing very much in size.

The party left the Yukon, at the mouth of a very small stream, at 3 p. m. July 28, and in a very short time was ascending to a high ridge, which it endeavored to follow. We were supposed to follow a trail, but if any existed, in many places and for long distances it was more than we could detect, though having already had considerable experience in such matters. A trail on the plains means quite a different thing from some of the so-called trails of Alaska. The trail from the Copper to the Tanana is in many places well worn, due perhaps to the travel of the moose as well as the natives over it, but the moss over which most of this route lay showed no breaks, save an occasional displacement due to the passing of the party of Koyukuns who were preceding us. There were many blueberries and a few salmon berries along the way. After a journey of 10 miles we went into camp where a small quantity of timber and water could be obtained. We depended for guides on the Koyukuns, whose efforts seemed to be directed toward following along the high ridges. Upon these the timber is dwarfed and scarce and water obtainable only in small pools. On the highest ridges no vegetation of any description exists.

We left camp the following morning in such a thick fog that a man could barely be seen at a distance of 20 yards. This fog continued all day, accompanied part of the while by rain, all of it by a strong wind from west-southwest. We halted at 1 p. m. to eat some hard bread, no wood being procurable for cooking. Here we found that we had wandered from our course to the westward. After eating we endeavored to correct our mistake, and at the end of a two hours' march in the fog were at the head of a tributary of the Tozikakat that bore east. The country, except where there is no soil, as along the highest ridges, is covered with a heavy growth of vegetation, such as mosses, lichens, etc. Within a radius of 3 feet I counted eleven different varieties of plants. The rock of the barren ridges is largely fragmentary and granitic, with occasional pieces of nearly pure quartz. Our general course during the early day was, as near as the fog would allow me to determine, north $\frac{1}{2}^{\circ}$ west; from noon to the tributary, north-northeast. A few minutes after sighting the Tozikakat tributary on our right we came in view of one of the Melozikakat on our left and were, of course, on the divide between them. This we followed in a northeast by north direction around to northwest by north, and went into camp on

a tributary of the tributary recently seen. The heads of all the streams are surrounded by timber, and here we found no exception. Our camp was in a grove of larger timber than any seen since leaving the Yukon. One tree, a spruce, was nearly 2 feet in diameter.

July 30 we left camp in a similar fog to that of preceding day. After traveling an hour beyond tributaries of Tozikakat the country became less marked by ridges, our course being over swampy grounds that characterize so much of the territory of Alaska, even on high elevations. Over this ground the footing is miserable, the hummocks, or têtes de femmes, offer a very uncertain hold for the feet. To walk between them is to walk continually in water of uneven depth, which consequently is very tiresome. The hummocks are covered with grass, moss, bush-birch, or blueberry bushes. Sometimes all of them grow there, with an addition of an occasional very small spruce.

Surrounding our camp was an extensive flat that had comparatively recently been burnt over, and a few small lakes. The cold wind and fog, though disagreeable, were welcomed as a preventive against the gnats and mosquitoes. There was no sign of a trail during the day. The natives unanimously agreed that six more days would be necessary to reach the Koyukuk. They were informed that rations would not be issued at the end of the fourth day. They believed it. We reached the river at the end of the fourth day.

The march of the 31st was quite similar to that of the previous day, except that the swampy grounds were more difficult to cross and the lakes more numerous. In many places for long distances we waded up to our knees. The day's march was about 16 miles and the general direction north-northeast ½° north. The ability of the natives to follow a trail and their keenness of eyesight is shown by the following incident of the day:

Early in the forenoon the field glasses dropped from their case, but were not missed for probably several hours afterwards. I never expected to recover them, so threw the case to a native. After a few minutes' consultation among themselves it was agreed that one of them should go back for the much-coveted article. I never suspected that he would be able to find them and doubted whether he would be able to follow our trail. At 7 o'clock in the evening he was sighted 2 miles in our rear, and an hour later he joined us in camp with the glasses.

Three miles south of camp we crossed a tributary of the Melozikakat, the largest seen by us, 40 feet wide and 4 feet deep. Our first efforts were directed toward extemporizing a raft. While engaged in the work, one of the Koyukuns, a deaf-mute, found a fallen spruce tree that was used as a bridge.

August 1 the route lay over higher ground, with better footing. After four hours' walking we reached the trail from the Tozikakat to the north, which we followed without difficulty. Three miles farther we crossed a small tributary of the Melozikakat, where the Koyukuns on their visit south had made a cache of some meat and fish. From this fact I inferred our portage was about half completed. During the afternoon we crossed yet another tributary of the Melozikakat, the last of that much-seen river. The last 5 miles of the day's march bore north 15° west. The distance traveled was 26 miles, the longest march made by us in any one day while in the Territory.

The march the following day was, however, nearly as long. The cold, cloudy weather was favorable to moving along rapidly, while the wind helped to relieve us from the torments of the myriads of gnats and mosquitoes. At the end of the day's march the natives informed us that but two days would be required to reach the Konootena. The following day in the forenoon we were on a ridge from which tributaries of it were visible.

We had crossed the so-called Yukon Mountains and had nowhere seen hills higher than 2,000 to 2,500 feet in height. Their highest points were devoid of snow. From our position were seen two small tributaries, one on each side, emptying into Tatatontly Lake. The outlet of this lake has the euphoneous name of Mentanontlekakat. The bearing of the river was north 3° east. We halted for dinner on its left bank, near a most miserable house used by some Koyukuns during the season of fish in the lake. After dinner we crossed the river and ascended a ridge, from which the lake was visible. Its length is probably 3 to 4 miles. Besides it, 55 small lakes were seen from our prominent position. Our packers were young and anxious to test their own

endurance as well as ours; so about 7 o'clock in the evening a running race for a full half hour, packs on back, was indulged in. They stopped satisfied that we were able to keep apace with them, though I must confess that it was the most stubborn contest I ever engaged in, and more than once I regretted having made the start. The last third of the day's march, 7 miles, was north-northeast. At 8 p. m. camp was made; the wind was gone; mosquitoes numerous. Our shelter tent of three widths of cotton cloth was thrown over an elongated "wickyup," which was then made mosquito-proof by putting moss around the sides and on the edges of the cloth. In this house Fickett and myself nightly sought repose. It was always constructed after the bedding was made down, because it was too low to permit any other order of arrangement.

We left camp August 3 at 5.30, and for four hours trod over a marshy soil to the junction of the Mentanontlekakat and Konootena rivers. On arriving there several shots were fired to notify the villagers on the Konootena, one-half mile above, of our approach. In a few minutes canoes came down the river and we were paddled up it to a village of 5 men, 3 women, and 5 children, situated on its left bank. The river at this place is about 30 yards wide and 5 or 6 feet deep, with a current of 4½ miles per hour. We had made the march from Nuklukyet, in latitude 65° 8′, longitude 152° 30′, to Konootena village, in latitude 66° 18′, longitude 151° 45′, a distance in a right line of 87 miles, by the trail at least 120 miles, in six and a half days. Considering the nature of the footing, this was a very unusual march and could not have been accomplished had not our packs been small and the weather cooler than that of many a day passed on the Yukon. It is a mistaken impression that so far north there can be no warm weather. During the middle of the day in midsummer, when the sun is shining, the heat is felt almost as much as it is in the Middle States.

In running down the Tanana River I was ten days without footgear of any description, and suffered no discomfort. At the village of Konootena, about 10 miles south of the Arctic Circle, likewise at the village of Nohoolchintna, about 15 miles north of it, nearly all the natives were barefooted. While traveling, however, protection of some kind is necessary for the feet.

KONOOTENA RIVER TO FICKETT RIVER.

At Konootena we had the usual difficulty in trading with the natives. At last two birch canoes were obtained, the Koyukuns discharged, and with our Yukon natives we started down the stream. After a run of about 14 miles in a direction north-northwest one-half degree west we reached the Koyukuk River, astonished to find such a great volume of water. Before leaving Nuklukyet the Koyukuns had informed us that its source could be reached by canoe in six days from the mouth of the Konootena. After seeing it with its current of nearly 4 miles per hour, I realized this to be impossible unless its head waters are the outlets of enormous lakes.

The Koyukuk, where we first saw it, was in a single channel about 300 yards wide, with high banks, covered with moss and burnt spruce on north side. Accompanying us were three canoes, containing each a man. Later a family, consisting of husband, wife, and small boy, in two canoes, joined us. The head of the family here, as on the Yukon, travels alone in a small canoe, while the wife and children travel in a large one. The two canoes we were using were "squaw" canoes; We immediately adopted the novel system of propelling them used by our traveling companions. We followed along the bank as closely as possible, where the current was least, and with light sticks in hand pushed the canoes forward. Fickett and myself, with two natives each, had a canoe; hence each canoe had three pairs of sticks for propellers. The sticks were put in the water about as many times per minute as the average oarsman would put in his oar in rowing. If properly skilled in the way of using these sticks there need be no trouble in steering. The bottom of the Koyukuk was well adapted for this sort of work, owing to its firmness. Nowhere in the river did we find quicksands. In this respect it presented a marked contrast to the Copper and Tanana rivers, and resembled in many respects that portion of the Yukon between the Ramparts and Nulato.

We found the water in the river at a high stage, due probably to the recent excessive rains. I can not think that the highest stage of water is coexistent with the greatest melting of snow on the mountains of its head waters, for this had taken place several weeks previously.

Camp August 3 was made 7 miles above the mouth of the Konootena, on its south bank, at the foot of a knoll from which high hills to the northward could be seen. Once, while on the trail, hills partially snow covered, north of the Koyukuk and near it, were seen. With this exception no snow had been seen since leaving Nuklukyet. During the night of the 3d, between 8 p. m. and 6 a. m., the river rose 18 inches. During the day and night of the 4th it fell 24 inches. It fell 10 inches on the night of August 6; rose 6 inches the following night, 13 the following, and fell 6 the next night. These radical changes in its stage in such short periods are readily enough accounted for when it is remembered that the entire face of the country is covered with a deep moss, nearly as thoroughly saturated as a wet sponge, and that but a few inches below this is a bed of rock, frozen ground, or ice that prevents the water sinking. This condition of affairs exists in a more marked degree the farther north they are noticed. The rises in the river above considered were all preceded by rain in our own locality. From the mouth of Konootna River up to the Allenkakat River frequent islands were passed, the position of nearly all of which is recorded on the map.

The mouth of Allenkakat is in approximate latitude 66° 37′, longitude 151° 16′. Below it is a very high cut bank of clay, called by the natives Unatlotly. Why this should receive a name when prominent mountain peaks did not I could not ascertain. On the right bank was a miserable barabarra and a spruce-bough tepee—the one a winter house, the other a summer one, but neither occupied.

The Indian with family who accompanied us was an old man. He had, as he said, been more than once over the mountains in which this tributary heads, to a rather small river, Basnuna, then down it to a large river, the Holoatna. He mapped out the Allenkakat, showing it to have five tributaries. He said it would require five days' paddling up it before beginning the portage, which would also take five days. The large river to which the portage is made is doubtless the Kowuk, which Lieutenant Cantwell, United States Revenue Marine, ascended during summer of 1885, and on which Lieutenant Stoney, U. S. N., is now encamped. At the junction it was difficult at first to decide whether the Allenkakat or the Koyukuk was the larger. The former can be ascended quite a distance in a steam launch, provided no falls exist. Below the Unatlotly the land on the north side near the river is for 5 miles very low and partly submerged.

We went into camp August 4 on an island 18 miles above last camp and 6 miles above the mouth of the Allankakat, where I found a single bone, the *os pubis*, of the mammoth, partially embedded in the alluvial soil. It was not in position, but had evidently been carried there by the water. It was in a fair state of preservation and to all appearances had never undergone any process of petrification. Here we made a cache of 50 pounds of flour and 8 or 10 pounds of bacon. These were made fast to the end of a long cottonwood pole, hoisted and allowed to rest against a standing tree. Other trees were cut so that by falling against the cache tree they afforded protection to the provisions and at the same time helped to mark the place.

Along this part of the river the current seemed less than above or below; a short distance above is a decided horseshoe bend with low land on each side. Five miles below camp August 5 is the small stream Sohjeklakakat, emptying from the north. Mount Cone was visible for first time when near the mouth of this stream. Though probably not more than 2,000 feet high, it is a very prominent landmark in this locality, as is also a double-pointed mountain bearing north-northwest. This and Mount Cone were all that could be seen from our low position of the ranges to which they belonged. At 8.40 we went into camp, thinking we had traveled a distance of 30 miles. When plotted it measured just 20, a discrepancy that frequently occurs, whether the travel be on foot or in boat, whether it be ascending or descending. We left camp in a cold rain storm that continued all day. At 4 p. m. we were at the mouth of the Nohoolchintna River, on which is situated an Indian village about equal in size to Konootena village, and from the natives' reports is about the same distance from the Koyukuk as is the former. This is the village toward which our camarades de voyage, the Koyukuns, were making. It is about 80 miles by the rivers from Konootena village, and is the last settlement on the Koyukuk, though the river extends probably 200 miles farther. Before permitting the Koyukuns to leave us, further inquiries were made with regard to the head waters of the river. The old man informed us that it would require three short or two long days' work to reach the Ascheeshna, a tributary empty-

ing on right bank. In this he was right. He claimed that it would require fifteen days to reach the second tributary, Totzunbitna, also flowing in on the right bank. This I doubted, and so expressed myself to the old man, who insisted that he was right, further strengthening his statements by holding up his bare feet and counting the days' marches on his toes. Furthermore, he claimed that it would require thirty days to reach the head waters of the Koyukuk. Whether his latter statements be correct is a matter for future explorers to determine.

The other tributaries named in their order by the old man are Klakasiuka and Nuzuntotakyuhoo, on left bank; Ezozwatna, on right bank; and Hoochitna, the last tributary or river itself. I have indicated these in dotted lines on the map.

Our dogs could in the future be of no value to us, and on the other hand would consume much food if kept with us, so one was given to the natives, two killed, and two retained to be taken to the States. Having passed the mouth of the Nohoolchintna, we paddled and poled for two and a half hours to make a distance of 3 miles, where we went into camp. Our Yukon natives in a strange country, were now becoming very timid, worked indifferently, and begged to be allowed to go back. All refused to eat supper. A few hours after reaching camp three natives from the Nohoolchintna village joined us, bringing several dogs and one or two king salmon to barter. Their arrival seemed to have somewhat relieved the minds of our Yukon natives, who were willing to eat some breakfast. When it became necessary to leave camp in the cold rain, they again became faint-hearted and sullen. During the afternoon we passed high rocky banks on our left, which were of dark sandstone, much broken. Later some islands, above which the river was half a mile wide, were passed.

After making 12 miles we went into camp 8 miles below the north end of Moore Island, in approximate latitude 66° 54′, longitude 150° 27′. In the afternoon of the following day we had the first view of snow-covered mountains, the highest of which, as we then saw them, bore about one point south of west. Later the range appeared to have a course east and west. A smaller range of mountains was visible between the river and the snow-covered one, and is quite similar to the highest land between the Yukon and Tanana, and I have called it Becks Hills. Before going into camp snow-covered mountains became visible anywhere within an area of 50°. Several compass observations of Mount Cone served to locate it. A snow-covered mountain to its east showed Mount Cone to form a peak of the foothills of the principal range. About 10 miles above Moore Island, on the right bank, were the graves of several natives. The river had washed the bank away until the crosses which marked some of them were tottering, ready to fall into the water.

We went into camp on a small island near the foot of Becks Hills, after having traveled thirteen hours and having ascended the river 23 miles. The channel above the Allenkakat is much more divided by islands than below, and the river has a much more rapid current. The trees of this locality are indeed dwarfed, and are limited to spruces, cottonwoods, alders, willows, and some birches. Their foliage had already begun to show the effects of frost. This camp was about 67° 10′ latitude, 150° 30′ in longitude. We left the next morning with prospects for a clear day, a cold wind blowing from the snow-covered mountains. About half an hour later we were enabled to get an observation for longitude, the first for several days on account of the rainy weather.

Three miles above camp we were at the mouth of the Ascheeshna or Fickett River. Up to this time no diminution in the volume of water in the river was apparent, notwithstanding we had passed three tributaries, one of which appeared nearly as large as itself. We were beyond the habitations of the natives, in a country of little game, with about 8 pounds of rice and beans, 10 pounds of flour, 3 pounds of bacon, and 2 pounds of lard. It is true we had a cache of 60 pounds of food 68 miles below, yet we did not know what to expect before reaching Nulato. After ascending the Ascheeshna for 5 miles a halt was made to take an observation for latitude at our highest point, 67° 16′. The average width of this river is about 100 to 125 yards, with a depth near its mouth of 14 feet. Having become satisfied that this river would be navigable for many miles, we started down it to halt below its mouth, where the Koyukuk had 18 to 20 feet of water in it.

We ascended Mount Lookout to get, if possible, the general course of the rivers and the

mountains. From its summit, about 800 to 1,000 feet above the river, we obtained a splendid view of the valley of the Ascheeshna and the mountains in which it rises. The extreme mountains whence it comes appeared to be 60 to 80 miles from us in a right-line course. The highest peaks I should judge are about 4,000 feet high and were snow-covered one-third the distance to their bases. The valley presented no marked contrast to the other valleys previously described save in the absence of lakes. Its general course is north-northeast.

The bearing of the farthest visible water of the Koyukuk from Mount Lookout is northeast by east. For about 6 miles the river bears northeast one-half degree north, then for about 15 miles it bends toward Mount Cone (bearing east by north), thence by many turns to northeast by east. The more abundant growth of timber along the water enabled its course to be approximately traced. The mountains from which it seems to come are much farther away than those of the Ascheeshna, though doubtless the same. They appeared, as far as the eye, aided with field glasses, could determine, to become lower to eastward, though not to westward. A break in the mountains bearing northeast was seen at a distance of 20 to 30 miles. It is possible that this marks the valley of the Totzunbitna, described by the old Koyukun.

There are no lakes visible on either side of the Koyukuk. The mountains extended down but a short distance between the two rivers.

FICKETT RIVER TO HUGGINS ISLAND.

At 4 o'clock we made for our canoes, glad to get rid of the mosquitoes and sand flies, which were more numerous on the high land than near the water. At 5.30 we started downstream, "bound for home." In a few minutes we met a Mahlemute (Eskimo) in a patched and much-worn canoe, heading for headwaters of the Ascheeshna River, thence over the mountains to where there were "plenty Mahlemutes." Our natives, being unable to converse with him, obtained little information. His first request was for cartridges for his old model Winchester rifle, which had been furnished by the Arctic whalers.

As best we could learn, he had been down to Nohoolchintna on a trading expedition. He had quite a supply of dried salmon, some of which we obtained in exchange for tobacco. Having been informed by the traders from St. Michaels that Lieutenant Cantwell, United States Revenue Marine, would cross from the Kowuk to the Koyukuk and descend it, I surmised that this old Mahlemute had acted as his guide. It was impossible to make him understand us, so we parted none the wiser on that subject. He had a small skin bag filled with the crystals of iron pyrites, which he had brought forth, doubtless imagining he had a treasure. When informed that they were valueless, he gave them to our boatmen, who carefully carried them to the Yukon.

The run down to the junction of the Konootena was uneventful. On the morning of the 10th we passed some women and children from the Nohoolchintna, en route to the Allenkakat for fish. They were miserably clad and yet worse sheltered from the cold rain. To keep her child warm a mother put it next to her skin, by raising it over her head and dropping it down the enlarged neck aperture of her parkie. From these women we learned that the old Mahlemute we had met the preceding day lived on a tributary of the Holoatna. We went into camp at 6.15 p. m., 2 miles below the Allenkakat, having traveled about 40 miles. We had stopped at our cache, which had been undisturbed during our absence. The following morning we were again at the mouth of the Konootena, 468 miles from Nulato.

As we descended in latitude a marked difference in temperature was observed. We no longer had the cold winds from the snow mountains. At 1 p. m. we went into camp 17 miles below the Konootena and almost due west from it, unwilling to run farther without observation for longitude. During the run of August 12 (46 miles) seventeen islands were passed, the largest of which is Waite Island.[1] Thirty-seven different courses were followed, the river varying in width from 250 to 400 yards. The map, though constructed on a scale of 4 miles to the inch, is too small to show all the islands. At 20 miles below mouth of Konootena were high bluffs of dark sandstone. Five miles below the sandstone bluffs appears a very peculiar high red hill

[1] Called in honor of Miss Waite, of Washington city, who has evinced a marked interest in the development of Alaska.

barren of vegetation. It was not unlike some of the buttes of the "Bad Lands" of Dakota and Montana. I have called it Red Mountain.

As we descended broods of young ducks and geese were frequently met with, and our fare correspondingly increased and improved. Above the Nohoolchintna scarcely a water bird was seen, but from this time forward we succeeded in killing from 3 to 15 daily with scarcely any delay, and this while seated in canoes armed with one miserable shotgun and a carbine. The run of the 13th was 28 miles southwest by south, to approximate latitude 65° 44′. Camp was opposite Huggins Island,[1] 14 miles long. Coming in from the north side, Batzakakat River is reported. We could not see it on account of the island. If it exists, it is the only tributary within a distance of 181 miles.

HUGGINS ISLAND TO KOTEELKAKAT RIVER.

Ten miles below our camp we found a summer encampment of natives, Batzakakat, 10 in number, including men, women, and children. Their nearest neighbors in an easterly direction are the inhabitants of the Konootena village, 200 miles distant. From these natives we obtained quite a supply of fish, dried during the present season and stored away for winter use. Men, women, and children escorted us to the cache on an island 1 mile downstream to see that the bartering was properly done. After leaving Batzakakat village the river runs southwest 15 miles, then northwest 10 miles, with high rock bluffs most of the distance along the right bank. In the middle of the channel is an occasional high, rocky island, partially timber-covered. Farther the course is west for 8 miles, then west-northwest 15 miles. Below this the river runs in a most tortuous course to the Yukon, its meanderings equaling those of the Lower Mississippi. We halted for the night after a run of 63 miles, which put us in longitude 156° 03′. A few miles above our camp the right bank of the river for a short distance was ice, covered with soil to a depth of 4 or 5 feet. The topography of the adjacent country is such as to permit an explanation of its presence similar to that given by either one of two theories laid down in the appendix to "Beechey's Voyage to the Pacific and Behring's Strait." Twenty-five miles below the ice banks the Hogatzakakat empties from the north with a volume of water somewhat less than that of the upper tributaries on which the villages are situated. A few miles below are high banks of stone, rich in color, and intersected with small veins of quartz. Twelve miles below the Hogatzakakat River we found a family of Mahlemutes, 5 in number, encamped on a gravel beach. They were decidedly the most abject, poverty-stricken natives seen since we had left the head waters of the Copper River. None of the family had clothing of any description from the thighs down, and the small quantity of it they did possess was made of caribou skin, greasy and ragged. Their livelihood was a precarious one; they depended for food chiefly on young water fowls, secured by means of a tri-tined spear. They doubtless had caches of dried salmon somewhere in the vicinity, but we saw none. They pointed to the high mountains to the north, indicating at the same time that they would cross them when the litter of pups they were training had grown larger. Their dwelling was the only one of its kind that I saw in the Territory. It was pyramidal in shape and covered in with spruce bark. At a distance it resembled a much-smoked tepee of the Plain Indians, or else the house constructed of drift timber over the dead by the Mahlemutes of the coast.

At 4 o'clock we were at the beginning of Treats Island, which seemed to equally divide the water of the river. We were in doubt as to the channel to take. The natives decided the question and we passed along the northern side. The distance traveled by us in passing from its extreme eastern to western point was 28 miles, while the actual right-line distance between the same is but 10. Since plotting the map the natural inference is that we selected the longer route. Along the northern part of this island a portage of 1 mile would have saved travel by water of 12.

We stopped for the night on the island 5 miles above an Indian camp of 2 men, 3 women, and 6 children. Between their camp and ours the Dakliakakat River empties, and from it the

[1] Named after E. L. Huggins, captain Second United States Cavalry, for a long time a resident of the Territory, and a warm friend of the expedition.

trail starts over to the Holoocatna. It has been suggested that if a route be found over the mountains north of the Koyukuk, it might be used by shipwrecked sailors when unable to reach St. Michael by the coast on account of ice. This supposes also the loss of their provisions. Three routes exist, but an attempt to reach supplies at St. Michael trusting to food to be procured from the natives along the route would be fraught with more serious danger than a division of the party and the passing of the winter among the Eskimos.

The most westerly peak of the mountains to the north and near the trail is uniformly pyramidal in shape, and is doubtless a landmark to the natives. On the morning of the 16th we passed the mouth of a small stream, the Dakliakakat, near which was a camp of Koyukuns, consisting of 2 men, one of whom was blind, 3 women, and 7 children. In the afternoon a camp of 17 souls was also passed, the only one whose inhabitants offered to donate fish. They vied with each other in giving the greatest amount. Yet later in the afternoon we passed another camp of 1 man, 2 women, and 5 children, almost opposite the most northerly end of Cumberland Island. We halted for the night a few miles above the Husliakakat River, the largest tributary south of Allenkakat River. It is 100 yards wide and enters the Koyukuk almost at a right angle. There is an Indian village situated somewhere on its waters, though its position is not known. Below this tributary the river runs in zigzag courses south to Cawtaskakat River, a distance of 42 miles.

The Doggetlooskat River, 12 miles above the latter, empties from the west in latitude 65° 38′. While its mouth is but 10 miles by land from the most northern point of Colwell Bend, by river it is 40. For two days no mountains were seen on either side of the river save the apparently short range to the northward, containing the pyramidal mountain. The river in places was from 600 to 800 yards wide, its current not greater than 3½ miles. The Cawtaskakat is reported to head in a large lake, around which a few natives live.

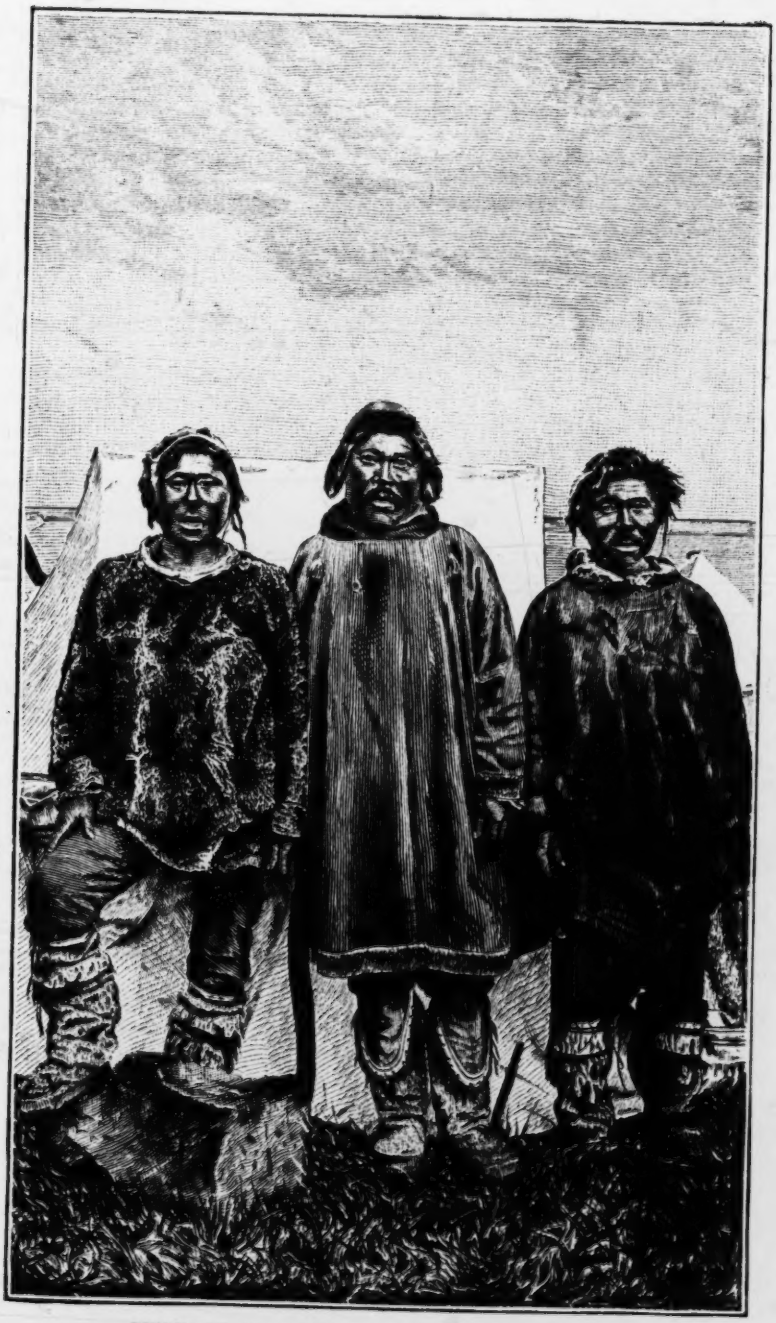
Eight miles below the Cawtaskakat and 3 miles below the Dulbekakat is the metropolis of the Koyukuk River, the home of a famous medicine man, Red Shirt, who was implicated in the massacre at Nulato in 1851, when Lieutenant Barnard, of Her Majesty's Navy, lost his life. I had met him a few weeks previous, on the Yukon River, en route to his home from a trading expedition to St. Michael. On arriving at his village we learned that he had gone over the mountains, via the trail of the Dakliakakat, to Kowuk River, to guide Lieutenant Cantwell to the Koyukuk.

Meeting Lieutenant Cantwell shortly afterwards on the *Corwin*, I learned that he had passed down the Kowuk before the arrival of Red Shirt. This village, numbering 45 souls, is located on the right bank of the river, in latitude 65° 29′, longitude 157° 07′. It is situated at the beginning of the Colwell Bend in the river, the distance across the neck of which is 3 miles, while around by the channel to same point it is 30. In the bend the river is marked by the absence of islands and high hills. On the morning of the 19th we began passing Wests Island, following the southern channel, and at night camped a few miles below it at the junction of the Koteelkakat. We were informed that to pass by the northern channel would require a very much longer time.

KOTEELKAKAT TO NULATO.

At the confluence of the Koteelkakat and Koyukuk rivers is a small island, on which a summer camp was situated; just across, on the right bank of the Koyukuk River, below the junction, is the site of the station established shortly after the transfer of the Territory. It has been abandoned for a number of years. Its position is in latitude 65° 18′, longitude 157° 46′, and is 56 miles from junction of the Koyukuk and Yukon. This is the highest point reached on the Koyukuk by Lieutenant Zagoskin, of the Russian Navy, in the winter of 1842, though he ascended the Koteelkakat to latitude 65° 35′. Around the abandoned trading station is an assemblage of three or four winter houses and a number of caches, which resemble the villages on the Yukon near the stations.

Thus far in the Koyukuk region we had been in terra incognita; but farther to its mouth white men had preceded us. The mouth of the Koteelkakat is 75 to 100 yards wide, though the river apparently is not very deep. The natives said it was a rather small river, a conclusion to be drawn from the topography of the country. The mouth of the Koyukuk is almost due south of that of the Koteelkakat, though many bends must be followed to reach it. In latitude 65° the



ESKIMOS OF UNALAKLIK RIVER, MEMBERS OF OUR CREW.

Koyukuk is but 2 miles from the Yukon, while 16 miles must be traveled by water to that river. Had we known this one of the natives could have been dispatched to Nulato to notify the captain of the steamboat of our near approach, and in consequence the party could have had transportation to St. Michael by steamboat instead of by canoe and foot.

Below the Koteelkakat are three small tributaries in the order named: Bitzlatoiloeta, Gissassakakat, and Succosleanty, the last two on the right bank. The river along this portion varies from 500 to 1,000 yards in width, with a current of about 3 miles per hour. On the 20th we passed two camps of natives, about equal in number to those previously mentioned. The trail to the Yukon is in the vicinity of Succosleanty River at the beginning of Nulato Bend, on the most easterly part of which we halted for the night. A few miles above the Succosleanty, on the right bank, are indications of coal beds, made manifest by pieces of slate coal found at the foot of a "landslide." Some large pieces of it were found that were of inferior quality, and a few small pieces that might be called a fair grade of bituminous coal.

August 21 we left camp on eastern extremity of Nulato Bend, wondering whether there was an end to the Koyukuk River. The journey had become very monotonous. The high hills on the left had given away to lowlands, showing that the Yukon Hills had terminated, while to the west were hills similar to the ones we had seen so much. At noon we halted on right bank, 10 feet above the water, for an observation. Cottonwood trees on this point were scarred to a height of 5 or 6 feet, showing that the river attains at certain seasons a rise of 15 or 16 feet. This would be sufficient to flood a large tract of land on the left bank. The place of our halt was in sight of Koyukuk Mountain, which touches both Koyukuk and Yukon water. We did not know at the time of our nearness to the latter river, which we reached at 1.30. At the junction of the rivers is a large island called Yukon Island, between which and Mount Koyukuk is a distance of 1,200 yards. At 3.30 we halted opposite an island of the Yukon River on which was an Indian camp. In answer to our signal a native crossed over and informed us that the steamboat had passed that point the preceding evening, which naturally made us feel comfortable. A few hours later natives at a fishing camp informed us that the steamboat had left Nulato bound for St. Michael, which announcement was very discomforting in view of the fact that the *Corwin* might already be at St. Michael, ready for her departure to San Francisco. About 15 miles above Nulato, on the right bank, a most excellent opportunity is given to study the crust of the earth for a depth of several hundred feet. The strata has been uplifted and the stratification left nearly normal to the water. We reached Nulato at 7.30, several hours too late for the steamboat.

NULATO TO ST. MICHAEL.

The steamboat having left Nulato with a liberal supply of wood, as we learned from the natives, there could be no chance of overtaking her, so a start was not made until the following morning. Some flour, tea, tobacco, and ammunition were obtained from the small supply of stores left at Nulato. The latter articles were used as money to purchase fish or such other food as could be found, and also to employ help. At Nulato only one man's services could be secured, notwithstanding liberal offers were made. The four natives who had accompanied us since leaving Nuklukyet could not be induced to go farther, so they were paid and discharged.

A start down the Yukon with a single native was made at 8 o'clock the following morning, I had hoped by making the portage to Norton Sound to be able to reach St. Michael nearly as soon as the steamboat. Had I known that the revenue-cutter *Corwin* would not anchor off St. Michael before September 4, there would have been no necessity for forced marches. Her arrival was uncertain; furthermore, the anchorage near was such as not to allow her to remain in the vicinity during the strong winds which frequently occur there.

We called the native we employed "Dandy," which name was quickly taken up by other natives, and to which he readily responded. He is the native that murdered the Russian, Iván Kogénikoff, in 1882, though a more peaceable Indian in appearance does not at present live on the Yukon. Dr. George F. Wilson, U. S. A., who accompanied Lieutenant Schwatka, relates the circumstances of the murder as follows:

> The Russian, whose name was Iván Kogénikoff, was held in great fear by all the natives, not only on account of his naturally quarrelsome disposition, but on account of the very summary manner in which he had avenged a

murder occurring farther down the river some years ago, and many of them would have been delighted at the prospect of disposing of him had they dared. One night he was being literally dragged home in a helpless state of intoxication by an Indian whose brother had been killed by a son of Kogénikoff. The Indian seeing him so utterly helpless and so completely in his power, struck him on the head with an ax, considering the deed justifiable in revenge for the death of his brother.

At the time of his death Kogénikoff was living with Dandy's mother, whom he frequently beat, much to the displeasure of Dandy, who also considered this in the accumulative charges against his stepfather.

Five miles below Nulato we stopped at a village on the left bank, where I employed the services of the half-breed Demoósky to pack over the trail to the Unalaklik. At 3 o'clock we passed Kháltat's village, on an island in the middle of the river. This is always used as a stopping place in the winter by traders going to and returning from St. Michael, a fact that caused our action in paddling by to seem highly discourteous to Kháltat. We halted for the night at 7.35 at a small village on the right bank, having experienced the cleansing effects of a rain the entire afternoon. This camp is 65 miles below Nulato, and is the place where a native acquainted with the trail was obtained to pilot us over the summer portage, the one we traveled, and one which is very little used. Four miles below camp we halted the following morning at an Indian village for "water boots" (seal-skin boots). This is a village on Raymond's chart known as Yakutskalitnik, and consists of 6 to 8 houses. Here I met the messenger I had sent from Nulato about July 25, returning from St. Michael. He had made the journey as Indians usually do, satisfied that time is not an important element in any of their actions. We learned at this village that the natives around Anvik had broken into the store and carried away all the supplies and ammunition left by the trader, Mr. Fredericksen, in charge of his wife. Our hosts inquired what would be done with the transgressors, with whom they evidently sympathized. I here learned that it had been planned by the people all along the river to take possession of all the stores at the several posts. Demoósky said the natives above wanted to do the same, and that probably fear alone prevented. This man is something of a leader among them, and probably does more than any man on the river, unless it be his ally and fellow interpreter, Antoosky, to encourage them in their rebellion against the traders.

Six miles below Yakutskalitnik we reached the mouth of a small clear stream, the Autokakat, which we ascended 3 miles to the point of departure of the summer trail to the Unalaklik. Here we made a large fire and dried our effects, preparatory to packing them, as much as the then falling rain would permit. We left the Autokakat River at noon, and traveled five and a half hours over the softest footing until we made camp for the night. Our course for several miles was northwest $\frac{1}{2}^{\circ}$ west, then it turned more to the northward, so that our camp on high ground was northwest $\frac{1}{2}^{\circ}$ north from the mouth of the Autokakat.

The morning of August 24 was clear, and the trail, which presents no appreciable contrast to that from Nuklukyet north, lay along a high ridge convex to westward. The mosquitoes and gnats form a lively factor in the inconvenience of trail work in this part of the territory also. At 9 o'clock we halted on summit of high ridge between two tributaries of the Autokakat, one of which we had crossed the preceding day. From this place the trail turns the tributary by making an extended detour.

The principal tributary of the Autokakat bears considerably to west of the trail we followed. The latter part of the day's march was very severe. We had passed to where the ridges have given place to very high hills, which necessitated continual ascending and descending. Just before halting for the night we crossed in quick succession three tributaries of a Unalaklik tributary, the cross section of the largest of which would be represented by 16 by 3 feet.

We had traveled from 7 in the morning until 8.30 at night, including stops, yet I do not think the horizontal distance covered would exceed 14 miles. The following morning on awaking we found a heavy frost resting on all the vegetation, which presented a beautiful picture in the bright sunshine. From a high ridge about 3 miles from camp we first sighted salt water, the only time in my life when such a sight gave me a "home-like" feeling. To our right was the principal tributary of the Unalaklik.

UNALAKLIK RIVER, ALASKA.

FROM EXPLORATIONS OF PARTY COMMANDED BY

Lieut. W.T. Ayres, 2d U.S. Cavalry.

KOYUKUK RIVER

FROM EXPLORATIONS OF PARTY COMMANDED BY

Lieut. H.T. Allen, 2d U.S. Cavalry.

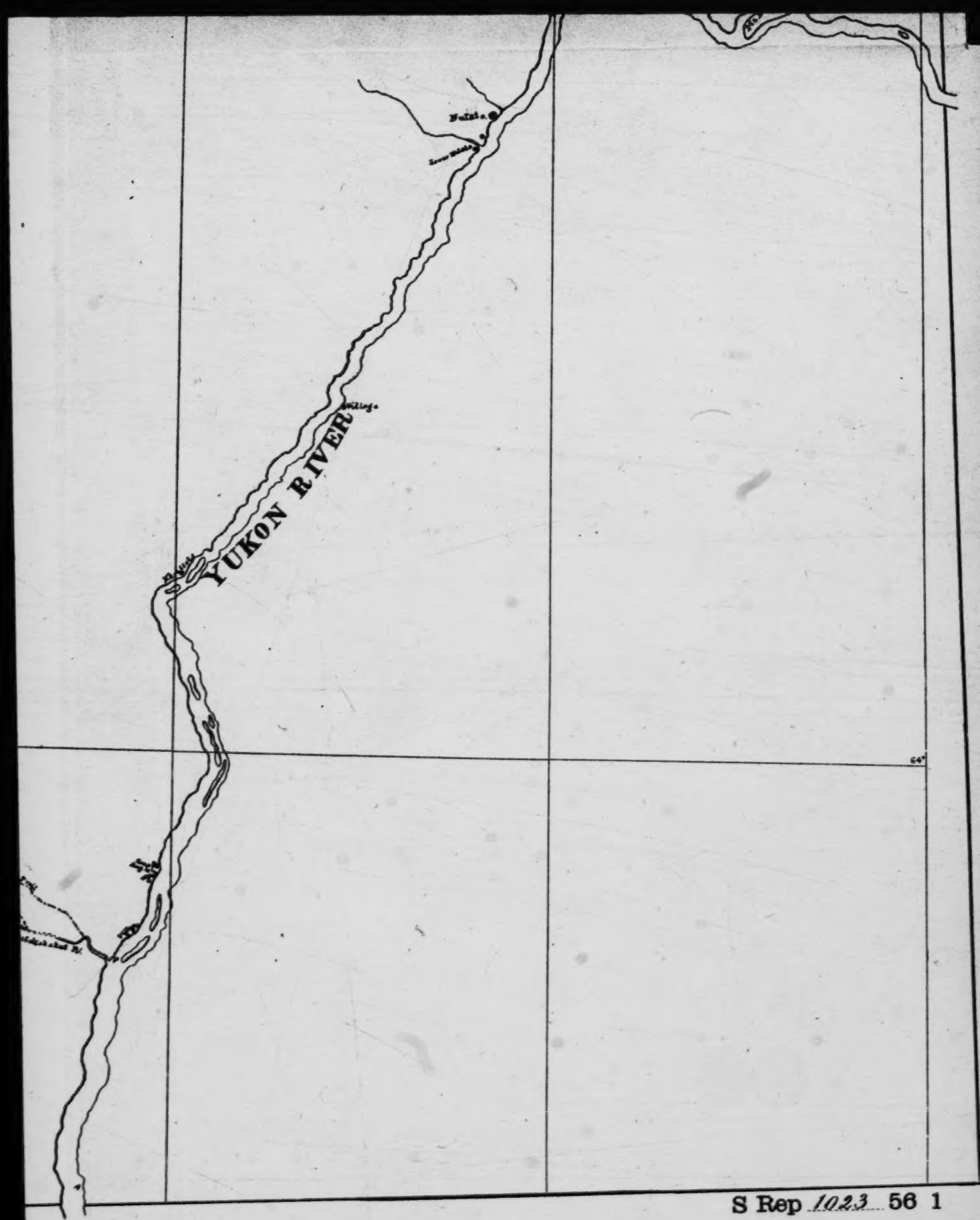
Drawn by Lieut. Allen and Marshall McDonald and Rudy Ruter in the Adjutant General's office Washington, D.C.

Statute miles

St. Michael's Id

St. Michael

Unalaklik River


YUKON R.IVER
64°

At 2.30 we had a fine view of the valley extending to the sea. At 6 p. m. we crossed the Sessekotna by wading, and at 8.30 went into camp on a high ridge, with no wood save a few scrub alders. The broken mountains, or rather hills, we had been continually ascending and descending were from 1,000 to 2,000 feet in height, and the end of a hard day's march showed but 11 miles to have been traveled.

At noon, August 26, we reached the Unalaklik at the village Ulukuk, situated between two tributaries about equal in size. Efforts were at once made to secure canoes, and the natives, as usual, began the play of "Much Ado About Nothing." The natives are Ingaliks, though all the other inhabitants of the river seen later are Mahlemutes. The method of Ingalik transportation in summer is by small birch canoes, any two of which would have been insufficient to carry our party, together with the dogs; hence resort was had to a "catamaran" constructed by fastening two canoes to each other a foot and a half apart, their axes parallel. In this craft we left the old man's village about 2 o'clock p. m. There was a current of about 4 miles per hour notwithstanding the very meandering course of the stream. A small stream was passed on each bank before halting for the night at 9.30, on the right bank, opposite a small tributary. At 7.30 the following morning we sighted a village of Mahlemutes, consisting of 6 men with corresponding number of women and children, all living in tents. Here we saw baidarras and baidarkas, the kind used on Norton Sound. The patriarch of the village joined us to share our fortunes and misfortunes, but more especially the food we had. In his language I detected a number of words used also by the natives of Nuchek. At this time I supposed the latter natives to be Aleuts, hence wondered much at the similarity. Two miles below the village is a small tributary on the right bank.

Our craft required frequent repairs, all of which were made by hauling it ashore, turning it bottom upward, and adding more pitch to the leaks, or else melting the old pitch so that it would run into the defective places. We halted at noon, where we saw a woman and child a short distance from the bank, supposing a settlement of some kind was near. Investigation showed a huge barrel and peculiar kind of tub filled with salmon berries in a state of fermentation and covered with small willows. Near at hand were two young dogs tied with willow sprouts. The woman and child had disappeared, doubtless frightened at our appearance. At 2.30 we arrived at the mouth of the Amiklona River, on the right bank near the junction of which was a Mahlemute village of 8 men. On the left bank of the Unalaklik and nearly opposite is another village, about one-third as large, at the junction of another tributary. As the coast is approached the river becomes wide and the current sluggish. The mouth of it is divided into several channels, and the adjacent country for quite a distance from the coast is as flat as the prairies. The village Unalaklik, reached at 4 p. m., is situated on right bank, on the coast, and is constructed entirely of drift timber, vast piles of which cover the beach. The village is indeed a curious spectacle, about half of each house being under ground and their roofs covered with soil and rank vegetation.

The smell of fish, seal oil, etc., was sufficient to cause an investigation of their storerooms. Large quantities of each, also berries, were found stored away in the semisubterranean houses. The village was capable of containing several hundred natives, and doubtless does in the winter time, when all the bands are assembled. This village offers a most interesting place for studying the ethnology of the Mahlemute. Unfortunately, we found but two men here, one of whom I sent to St. Michael, with a note to commander of the cutter *Corwin*, the other up to the villages recently passed on the Unalaklik, to secure a baidarra and crew with which to travel to St. Michael, about 55 miles distant by the coast. We went into camp under a baidarra 40 feet long that we found on the bank of the slough behind the village. About 3 p. m. the following day the natives arrived from up the river with a baidarra, much in need of repairs, and a crew of but two men.* A few hours later a similar kind of boat was seen in the direction of St. Michael. While still making our preparations the baidarra recently sighted landed, bringing us the welcome news that it was at our disposal and that the cutter had not been sighted at St. Michael. Mr. Lorentz, of the Alaska Commercial Company, had directed the Mahlemute in charge to put the boat at our disposal, should we so desire.

From Unalaklik St. Michael bears about west southwest. After getting several natives

besides the two from Nulato, we left the 29th of August with an unfavorable wind for us. When about a mile out the wind and heavy surf on the bar we were passing threw the natives into such a consternation that with difficulty they were prevented from returning. A few miles farther we ran to the beach at a small settlement to enable a new member of the crew to get in. We paddled and sailed until 5 p. m., when it was found that the excellent footing along the beach was favorable to cordelling, a faster method of traveling than paddling and sailing.

Our baidarra was 36 feet long, 7 feet wide, and 2 feet 9 inches deep, rigged with a single square sail, a la Mahlemute. At 4 o'clock the following day we were at a village called Kegiktowruk, and at 8:30 at St. Michael, where we remained until September 5, when we started for San Francisco via Unalaska. Mr. Lorentz, chief trader for the Yukon country, did all in his power to make the party comfortable during its stay in St. Michael, and, furthermore, granted us the use of his photographic instrument and plates.

THE MAPS.

The most valuable map extant of the interior of Alaska is that compiled by Dall in 1884 "from all accessible data," and printed by the Coast and Geodetic Survey. This includes the work in the interior of the Territory of a number of persons, among whom are Dall and other members of the Western Union Telegraphic Expedition, Raymond, Schwatka, Ray, the Krause brothers, Nelson, Petroff, and others.

The maps forwarded with this report include one each of the Copper, Tanana, and Koyukuk rivers, and one representing part of the Yukon River and the Unalaklik; also a general map.

Accuracy can not be expected of a survey executed in the hasty manner in which this was, yet I think the great care taken to secure a correct geographical description of the rivers will prove them to be of much practical value. The topography of the country away from the rivers could not be attempted, except in the most general way, yet I am sure that the delineation of the mountain system will be found more nearly correct than on any previous chart.

Each of these maps is constructed on a polyconic projection from tables published by the Bureau of Navigation, and, with the exception of the general map, on a scale of 1 inch to 4 miles, or $\frac{1}{253440}$.

On the map of Copper River the one hundred and forty-fourth meridian has been used as the central one, on the Tanana the one hundred and forty-seventh, on the Koyukuk the one hundred and fifty-second, and on the Unalaklik the meridian of Nulato.

I have previously spoken of inaccuracies in the determination of longitude due to the non-uniform rate of the watch. The observations for it were made by Private Fickett, while I recorded them. To avoid the effects of errors as much as possible we rated the watch at Taral, Nuklukyet, and at St. Michael, and reduced the observations taken at intermediate points by using rates determined in rear and advance. When the results differed, as they nearly always did, a longitudinal position somewhere between the two was used. Its nearness to one or the other was given in accordance with the adjudged correctness of the rates. At best the longitude is only approximate, but in the determination of latitude, time being a very small function, the results are more reliable. The latitudinal observations are necessarily a check on the courses determined by compass bearings, and the latter helped to check those for longitudes, while the reverse of the last statement should properly be the case.

Throughout the entire journey the exact time consumed on each course and the direction of that course were recorded. Our rate of travel, whether by foot or by boat, was necessarily estimated. Had we simply floated down the streams, the rate could have been fairly accurately obtained by measuring the swiftness of the current; but the value of our paddling, more or less spasmodic, had to be estimated. At all times the tendency was to overestimate, and in plotting some of the distances needed to be reduced one-half. Four hundred and forty-one compass bearings were used in plotting the Koyukuk River alone and proportionately nearly as many for the other rivers.

The Copper River, as shown on the charts, is included between the sixty and one-half and sixty-third parallels and between the one hundred and forty-second and one hundred and forty-

seventh meridians, and drains approximately 25,000 square miles. The Tanana, as shown, is included between the sixty-two and one-half and sixty-fifth parallels and between the one hundred and forty-two and one-half and one hundred and fifty-second meridians, and drains approximately 45,000 square miles. The Koyukuk is included between the sixty-fifth and sixty-eighth parallels and between the one hundred and forty-seventh and one hundred and fifty-seven and one-half meridians, and drains approximately 55,000 square miles. The relations that these numbers bear to each other express the approximate ratio of the volumes of water discharged by these rivers. Chart III, besides representing the Koyukuk River, includes the Yukon from the mouth of the Tanana to Nulato, drawn largely from field observations of the party. Chart IV contains the Yukon from Nulato to Yakutskalitnik and the Unalaklik, drawn entirely from field notes of the party.

The general chart includes nearly all that portion of Alaska north of the sixtieth degree of latitude and west of the one hundred and thirty-seventh degree of longitude, and is drawn to a scale of 1 inch to 15 miles, or $\frac{1}{950400}$. The one hundred and fifty-second has been used as the central meridian, and, inasmuch as the rivers from the other charts have been reduced to conform to the proper scale, without any allowance for the positions of their central meridians, the relative positions of the rivers are not exactly what they should be.

The chart of the Coast and Geodetic Survey has been followed for coast line and in other respects, while Raymond's and Schwatka's charts are chiefly the authorities for the Yukon.

I am sorry not to be able to include in this chart the results of the work of Lieut. J. C. Cantwell and Assistant Engineer S. B. McLenigan, of the United States revenue steamer *Corwin*, who explored in 1885, respectively, the Kowuk and Nowatak Rivers. From the former's report the lake source of the Kowuk (67° 1′ latitude, 153° 30′ longitude) is taken.

An outline map of the entire territory has been constructed on a convenient place on the general chart on a scale of 50 miles to the inch.

Tables of Distances.

DISTANCES ON THE COPPER AND CHETTYNA RIVERS.

Locality.	Description and position.	Distances from—			
		Preceding locality.	Nuchek.	Alaganik	Taral.
Nuchek	On Hinchinbrook Island, 432 miles west of Sitka	.....	.....	.....	.....
Skatalis	Summer village of 2 houses near the western mouth of Copper River	46	46	.....	.....
Alaganik (Anahanuk)	Village of 5 houses near the western mouth of Copper River	4	50	.....	.....
Child's Glacier	Largest glacier, right bank, beginning of Abercrombie Canyon	28	78	28	.....
Miles's Glacier	Largest glacier of Copper River, left bank, lat. 60° 44′, long. 145° 33′	2	80	30	.....
Camp April 2	Northern end of Abercrombie Canyon, on rocks in the middle of the channel.	6	86	36	.....
Baird Canyon	High bluff on left bank, vegetation-covered glacier on right	8	94	44	.....
Bremner River	Mouth on left bank, lat. 61° 2′, long. 145° 30′	14	108	58	.....
Tasnuna River	Mouth on right, lat. 61° 5′, long. 145° 27′, opposite Cottonwood Island	5	113	63	.....
Konsina River	Small stream on right bank	10	123	73	.....
Tickell River	Small stream on right bank, lat. 61° 19′, long. 145° 46′	11	134	84	.....
Spirit Mountain	Left bank, camp August 7	10	144	94	.....
Wood Canyon	Southern end	13	157	107	.....
Taral	Midnooski village of 2 houses, site of an old Russian trading-post, lat. 61° 38′, long. 145° 6′.	5	162	112	.....
Chettyna River	Mouth on left bank	2	164	114	.....
Midnooski Creek	Mouth on right bank Chettyna	11	175	125	13
Dora River	Mouth on right bank Chettyna, lat. 61° 24′, long. 144° 17′, Camp April 14	18	193	143	31
Chettystone River	Mouth on right bank Chettyna, lat. 61° 22′, long. 143° 51′, Camp April 16	22	215	165	53
Camp April 17	Beginning of trail to Nicolai's	6	221	171	59
Junction of central and southern branches.	Visible from high point of trail, about 18 miles	18	239	189	77
Camp April 18	On trail to Nicolai's midway between Chettyna and Chettystone rivers	18	239	189	77
Nicolai's house	Left bank Chettystone River, lat. 61° 26′, long. 143° 17′. (From Nicolai's house to mouth of Chettystone via the river is 58 miles.)	13	252	202	90
Messala's house	Messala River, left bank of Copper	.....	178	128	16
Liebigstag's village	Liebigstag River, opposite on left bank, lat. 61° 57′, long. 145° 45′	24	202	152	40

Tables of Distances—Continued.

DISTANCES ON THE COPPER AND CHETTYNA RIVERS—Continued.

Locality.	Description and position.	Distances from—			
		Preceding locality.	Nuchek.	Alaganik.	Taral.
Coneguanta's village	Summer houses on left bank, winter houses on right, lat. 62° 10′, long. 146° 30′.	31	233	183	71
Klatena River	On right bank, 1 mile below Klawasina	10	243	193	81
Tazlena River	On right bank, heads in Lake Plaveznie of the Russians	12	255	205	93
Tonsena River	On right bank, lat. 62° 32′, long. 146° 40′	25	280	230	118
Gakona River	On right bank	9	289	239	127
Sanford River	On left bank Torrent, lat. 62° 44′, long. 146° 22′	32	321	271	159
Chestochena River	On right bank	16	327	287	175
Camp May 30	On left bank, beginning of trail to Batzulneta's	17	364	304	192
Camp June 1	Near left bank of Copper River, on the trail	29	382	383	221
Batzulneta village	On Batzulneta Creek, 4 miles from its mouth, lat. 62° 58′, long. 145° 22	10	393	343	231
Lake Suslota	A reservoir of Slahna River, a tributary of Copper	10	403	353	241

DISTANCES ON TANANA RIVER.

Locality.	Description and position.	Distances from—			
		Preceding locality.	Nuklukyet.	Nandells.	The sea.
Tanana River	Mouth, left bank of Yukon River	.....	18	548	684
Harpers Bend	Southern part	26	44	522	710
Old Station (Harpers)	Abandoned on right bank, lat. 64° 47′, long. 151° 14′	22	66	500	732
Summer village	Mouth of Toclat River, left bank	19	85	481	751
Lorentz River	Mouth, left bank, 2 miles below Baker Creek, on right bank	12	97	469	763
Dugan River	Mouth, left bank	26	123	443	789
Camp June 22	Right bank, lat. 64° 44′, long. 149° 37′	14	137	429	803
Cantwell River	Left bank, fishing station, 4 miles above small stream on left	35	172	394	838
Camp June 21	Right bank, 2 miles above small stream on left	8	180	386	846
Summer village	Right bank, 3 miles below small stream on left	25	205	361	871
Camp June 20	Right bank, river very wide. Probable head of navigation	22	227	339	893
Delta Creek	Two miles below camp. Head of navigation, lat. 64° 18′, long. 147° 51′	38	265	301	931
Delta River	Left bank	25	290	276	956
Volkmar River	Largest tributary, right bank	10	300	266	966
Masons Narrows	Small streams above and below on opposite sides	5	305	261	971
Camp June 18	Right bank, lat. 64° 13′, long. 146° 39′	11	316	250	982
Goodpasters River	Right bank, second tributary in size	12	328	238	994
Gerstle River	Left bank	4	332	234	998
Camp June 17	Lat. 64° 8′, long. 145° 54′, in Johnson Rapids	24	356	210	1,022
Johnson River	Left bank, head of Carlisle Rapids	26	382	184	1,048
Tower Bluff Rapids	Lower part, Camp June 16	24	406	160	1,072
Robertson River	Left bank, opposite Tower Bluffs and head of rapids	29	435	131	1,101
Cathedral Bluffs	Right bank	15	450	116	1,116
Kheeltat River	Right bank, trail to Fetultin	10	460	106	1,126
Mentasta Trail	Left bank, also beginning of trail to Nandell's	6	466	100	1,132
Tok River	Left bank	40	506	60	1,172
Camp June 14	Left bank, lat. 63° 32′, long. 143° 58′	8	514	52	1,180
Tetling River	Left bank	32	546	20	1,212
Tetling's house	On Tetling River	9	556	11	1,221
Nandell's house	Nearly south of Tetling's	11	566	0	1,232

Nandell's to Wolverine Gorge (north side Alaskan Mountains), 9 miles.
Wolverine Gorge to Lake Suslota=distance across Miles Pass, 49 miles.
Middle Point of Miles Pass=1,265 miles from the sea via the Tanana and Yukon rivers.
Middle Point of Miles Pass=384 miles from the sea via the Copper River.

Tables of Distances—Continued.

DISTANCES ON THE KOYUKUK RIVER.

Locality.	Description and position.	Distances from—			
		Preceding locality.	Nulato.	Fickett River.	The sea.
Nulato	Right bank of Yukon	.....	.....	556	467
Koyukuk River	Mouth on right bank of Yukon, lat. 64° 44′, long. 158° 10′	24	24	532	491
Nulato Bend	Most eastern part, camp August 20	16	40	516	507
Indian village	Left bank, 4 miles below Bitzloitocla River	20	60	496	527
Koteelkákat River	Mouth right bank, abandoned station, Indian village, lat. 65° 18′, long. 157° 46′	20	80	476	547
Wests Island	Most southerly point	4	84	472	551
Do	Most northerly point	28	112	444	579
Camp August 18	Right bank	8	120	436	587
Colwell Bend	Most northerly part	14	134	422	601
Red Shirt's village	Right bank, lat. 65° 29′, long. 157° 15′	16	156	406	617
Kawtaskakat River	Left bank, camp August 17	10	160	396	627
Doggetlooskat River	Right bank	11	171	385	638
Hussleakatna	Right bank, 2 miles above southern end of Dalls Island	31	202	354	669
Dalls Island	Upper end	9	211	345	678
Treats Island	Western extremity	8	219	337	786
Daklikakat River	Right bank, north of Treats Island, near trail leading to Kowuk River	12	231	325	798
Camp August 15	On Treats Island, lat. 66° 3′, long. 156° 40′	6	237	319	804
Treats Island	Eastern extremity	10	247	309	814
Hogatzakakat River	Right bank	21	268	288	835
Camp August 14	Left bank, lat. 65° 53′, long. 156° 3′	14	282	274	849
Ice Banks	Right bank	17	299	257	866
Barnard Island	2 miles long	24	323	233	890
Batzakakat	Indian village, right bank, western extremity McQuisten Island	24	347	209	914
Camp August 13	Left bank, opposite McQuisten Island	8	355	201	922
Twin Islands	Each about 3¼ miles long	14	369	187	936
Camp August 12	Left bank, lat. 66° 3′, long. 153° 57′	14	383	173	950
Waite Island	Northern extremity	17	400	156	967
Red Mountain	Right bank	10	410	146	977
Camp August 11	On left bank, just above Eight-mile Bend	36	446	110	1,013
Konootena River	Left bank	17	463	93	1,030
Mayo Island	Mayo Bend	8	471	85	1,038
Allenkakat River	Right bank, lat. 66° 39′, long. 151° 35′	13	484	72	1,051
Sojeklakakat River	Right bank	23	507	49	1,074
Fish Island	Mouth Nohoolchintna River, on left bank	9	516	40	1,083
Camp August 7	On right bank (ascending the river)	15	531	25	1,098
Moores Island	North end	18	539	17	1,106
Mount Lookout	Near right bank, camp August 8	15	554	2	1,121
Fickett River	Right bank, lat. 67° 10′, long. 150° 30′	2	556	0	1,123

The mouth of the Konootena = 125 miles by trail from Nuklukyet.
The highest point reached on Fickett River = 99 miles from mouth of Konootena.

Tables of Distances—Continued.

DISTANCES ALONG THE YUKON AND SUMMER ROUTE TO ST. MICHAEL.

[Distances above mouth of the Tanana are taken from reports of Raymond and Schwatka.]

Locality.	Description and locality.	Distances from—			
		Preceding locality.	Nuklukyet.	St. Michael via the trail.	Crater Lake, head of Yukon.
Nuklukyet	17 miles below mouth of Tanana	.....	.....	419	1,287
Dep. of trail to Koyukuk	Right bank	6	6	413	1,293
Gold Mountain	Right bank, lat. 65° 5′, long. 153° 43′	35	41	378	1,328
Nowikakat River	Left bank, 2 miles below trading post	24	65	354	1,352
Melozikakat River	Right bank	42	107	312	1,394
Little Mountain	Left bank, near Little Mountain Island	57	164	255	1,451
Koyukuk River	Right bank	13	177	242	1,464
Nulato	do	24	201	218	1,488
Khaltat's house	do	32	233	186	1,520
Autokakat River	Right bank, lat. 63° 45′, long. 159° 10′. Pt. dep. for Unalaklik River	43	276	143	1,563
Beginning of trail	Left bank of Autokakat	3	279	140	1,566
Camp August 24	On the trail, lat. 63° 56′, long. 159° 57′	29	302	111	1,595
Ulukuk	Ingalik village, between branches of Unalaklik River	14	322	97	1,619
Unalaklik	Innuit village, mouth of Unalaklik River	42	364	55	1,661
Fort St. Michael	On island of St. Michael	55	419	0	1,716

The Yukon River is navigable as far as Miles Canyon, which is 1,784 miles from its mouth (Aphoon Outlet), 818 miles above Fort Yukon, and 327 miles above Fort Selkirk. The length of the river above Fort Yukon is 989 miles; below Fort Yukon to mouth (Aphoon Outlet) is 966 miles.

THE NATIVES.

NATIVES OF COPPER RIVER.

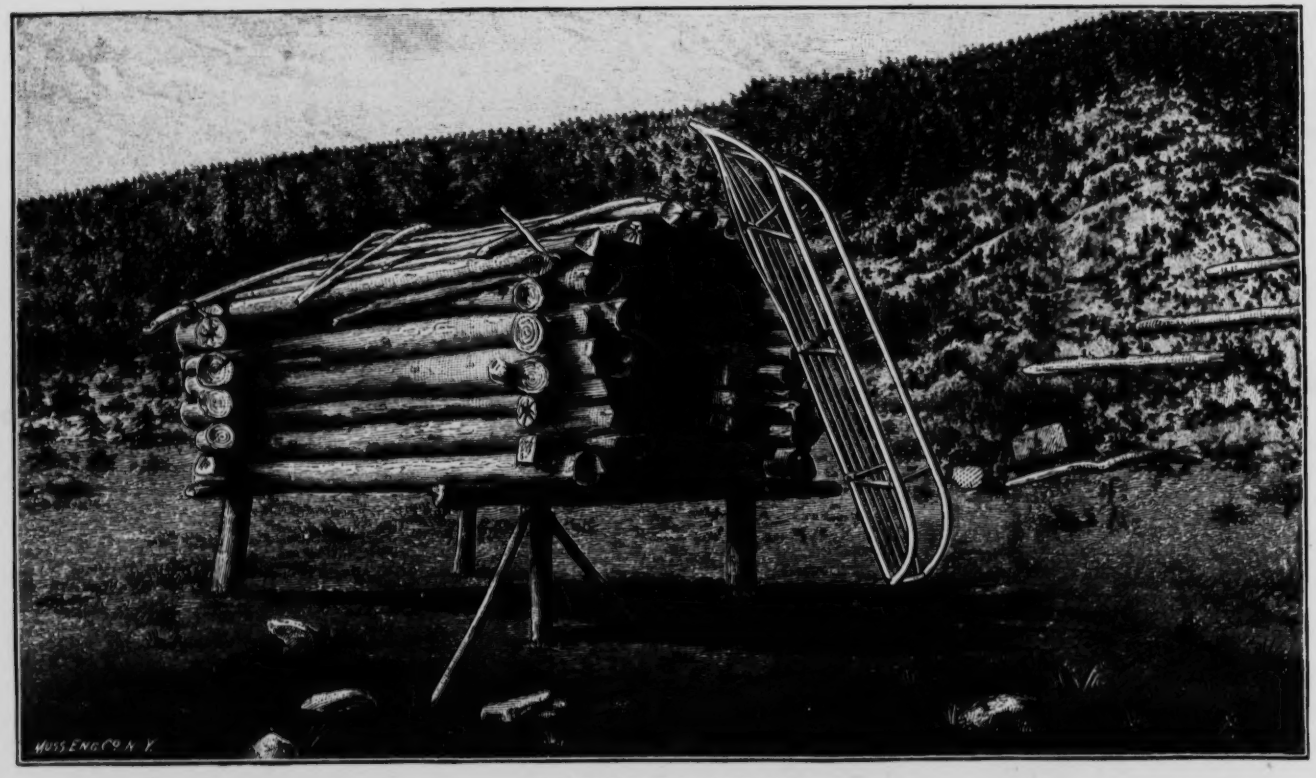
Upon examination of the natives of Copper River it is found that they are as a rule between 5 feet 6 and 5 feet 8 inches in height, though occasionally a man fully 6 feet is seen, and weigh about 140 pounds; that the color of their skin is a brown, tinged with copper, and much darker than that of their nearest coast neighbors; that their hair is generally straight, exceptionally wavy; and that their eyes are invariably black or nearly so. A great difference in mobility of countenance was noticed, the faces of some being nearly as capable of indicating emotions as those of a civilized people, while those of others are almost entirely devoid of expression under any circumstance. Their muscular strength is not so remarkable as their ability to travel great distances in a short time on scanty rations. Ample opportunity was given for measuring their strength and endurance with those of our party. The result of the first few days' work was favorable to them. It is true, however, that our party was selected with special view to physical strength.

It is an unusual occurrence to see a father and mother with more than three children. Whether this smallness of family is due to the hardships incident to the gaining of a livelihood or to malpractice in some of its forms I am unable to say. As a fact that with them, too, poverty may be blessed with children, I will instance that one of the most destitute families met consisted of father, mother, and four children, some of whom were sadly emaciated by hunger.

The nature of their food causes so much wearing of the teeth that children are found with the first set worn almost to the gums. With adults the teeth are worn down to the gums while the body is yet in its prime.

The faces show the result of subjection to hardships long before the hair begins to turn gray. Owing to their ignorance of methods of computing time, I was unable to ascertain anything definite relative to their ages. Messála, however, who lives on the left bank of Copper River, one day's march from Taral, and presumably led the party of massacre against the Russians in 1848, was then a man of years and influence.

The only sickness noticed among them was due to costiveness, which doubtless disappears as



A MIDNOOSKY CACHE AND SLED.

soon as the run of salmon arrives. But one natural deformity was observed—a shriveled leg—yet the toes of nearly all are abnormally crooked from snowshoe travel.

Their sagacity in following trails and hunting game is probably not greater than that of others of the Tinneh family, but would astonish one not accustomed to the skill of natives in this respect.

All the people of the Copper River region were called by the Russians Midnoóskies (more properly Midnóvtsi), and all belong to the great Tinneh family, which peoples the interior of Alaska. Those below the Tazlena River, from their association with Russians, have adopted some abbreviated form of the same, such as Minúsky, Minoósky, etc., while those above it style themselves Tatlatáns. I think the name Atnatána, the Indian name for an inhabitant of Atna (Copper) River region, would be a fitting term for the people of both tribes, who differ very little from each other. To particularize, I have used the term Midnoósky for the people south of the Tazlena, including those living on the Chettyna, and Tatlatán for those living north of the Tazlena.

The entire number of natives on the river and its tributaries is about 366, divided as follows: Men, 128; women, 98; children, 140. Between Alaganik and Wood Canyon, a distance of 110 miles, there are no settlements, yet an occasional party goes down to Bremner River to hunt moose. On the Chettyna and its tributaries are about 30 souls; on the head waters of Tazlena and Lake Plaveznie, probably 20. The Tatlatáns, including the settlement at Lake Suslota, number 117. On the Copper, including tributaries between Taral and the Tazlena, are 209, the total number of Midnoóskies. Nicolai is autocrat of the Chettyna River and the fishing rendezvous, Taral, while between the latter place and the Tazlena this privilege is exercised by Liebigstag and Conequánta, the former controlling the lower part; the latter, with the largest following of any Atnatána, the upper. The chief native among the Tatlatáns is Batzulnéta, who is a shamán.

As far as I am able to judge from the scanty records of the Russians and my own observations, I should say that the change in number of these people has been very slight for many years. Their history, so far as their records are concerned, will always be a sealed book. On both banks of the river between Chettyna and the Klawahsina River, more especially on the left bank, are frequent excavations 2 to 4 feet, indicating the sites of houses. The more recent of these show signs of the attached bath house. In some older excavations spruces of the largest size are growing.

The territory of the Atnatánas is included between the one hundred and forty-second and one hundred and forty-seventh meridians and between the sixty and half and sixty-third parallels, representing an approximate area of 25,000 square miles, all of which is drained by the Copper and its tributaries. Practically excluded from the rest of the world, it is but natural that they should be a conservative people. With mountains on all sides, their routes of travel are chiefly confined to the water courses winter and summer. Were it practicable to pass from Taral to the upper waters of the Copper by going nearly due north, one-half the distance over the river route which is and must be followed would be avoided. Between these localities are some of the highest mountains of the northern continent, and certainly the highest volcano (Wrangell); below Taral are huge glaciers, Miles and Childs, which hem in the river, rendering navigation extremely dangerous. Besides these geographical considerations, the climate, which is practically seven months severe winter, affects in a large measure the customs of the people.

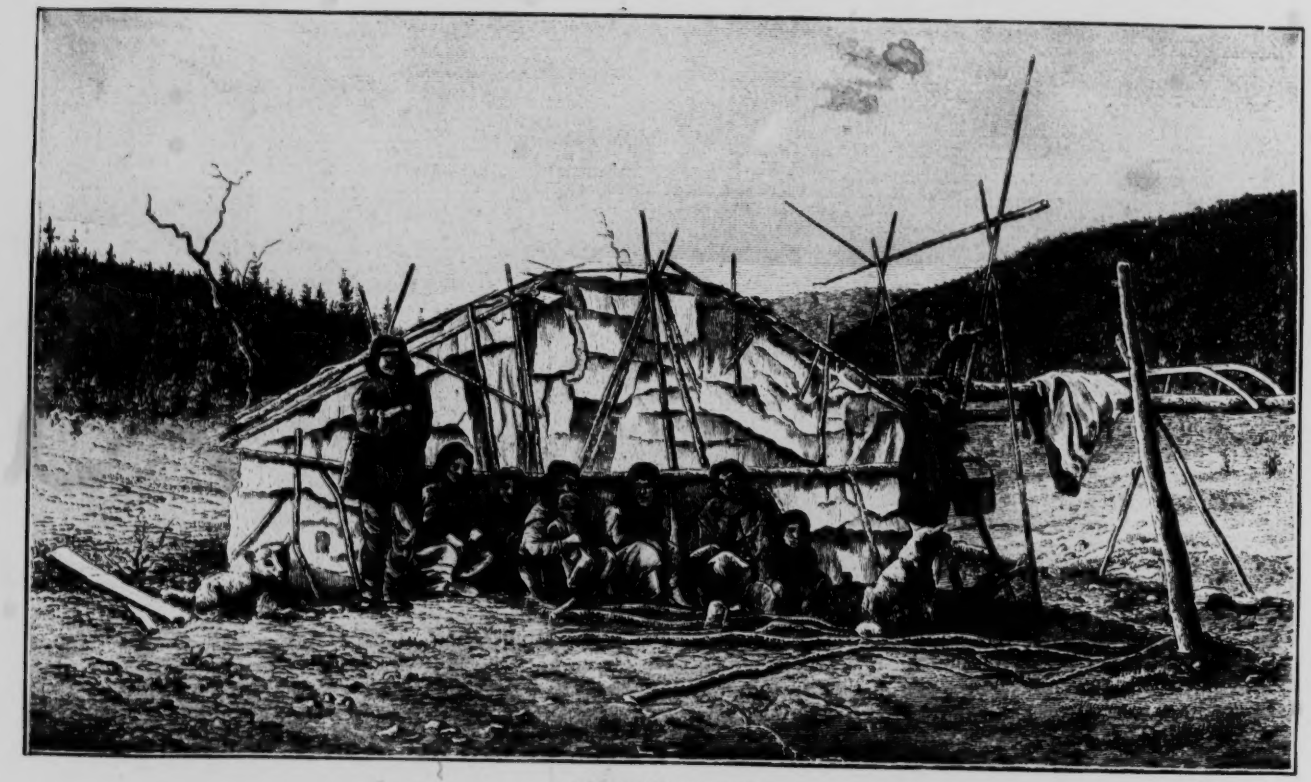
Their vegetable products are limited, scanty in variety and in quantity. Besides the berries, including cranberries, blueberries, a small red berry (called by them giniss), a small black berry (called by them gizneh), quite similar to the red one, is a fruit called tombá, that grows on a bush several feet high. It hangs on the bushes all winter, and may be eaten in the spring, even to summer, when it is very dry and nearly tasteless. The shape and nature of the fruit are very similar to the black haw, though it is of a yellowish-white color. The natives fry it in moose or other fat, at the same time mashing it well with a stick or spoon, thus making of it a palatable dish. Their chief vegetable food, however, is a peculiar parsnip-shaped root, but longer than that vegetable, which they call chass. The portion of it above ground is not more than 6 to 12 inches and not unlike a bunch of small willows, while the root is frequently several feet long. It is never cured, but is eaten raw, boiled, or roasted.

Fish, rabbit, moose, sheep, caribou, bear, goat, porcupine, beaver, lynx, muskrat, goose, duck, and grouse constitute the mass of their food. Of these fish is decidedly the most important, with rabbits next in order. They have no process of curing save that by drying in the sun. The fat of the moose is melted and run into the smaller intestines, while the blood is saved in the paunch. It is of little importance to them whether or not their meat be cooked, and in boiling it is seldom allowed to become done through. The entire entrails of rabbits are boiled, sometimes with the bodies from which they were taken, and again with other meat, and form one of the most potent antiscorbutics used by them. Good or special food is always cooked by the men, and the refuse of all is given to the women. A boy five or six years old has precedence at meals over his mother. There seems to be almost no limit to the amount of food a hungry native can consume (and our experience when compelled to live as they do was in no respect different). A single kind of food must be abundant to furnish in sufficient quantities the necessary elements required by the system. A much less quantity of mixed food satisfies. Like most other Indians, they seem to eat when hungry, without regard to fixed intervals.

The only drink that I saw used by them, excepting tea, of which they are passionately fond, and the liquors in which the food is boiled, was made from the plant (lamb kill?) used by nearly all the Tinneh of Alaska and by the inhabitants of the Hudson Bay country and Labrador. No special preparation of this is required, not even drying being necessary before using.

If they possess any medicinal preparations or medicines of any description they are in the hands of the shamáns, who keep them carefully concealed. Their contact with the Russians and Americans, though very slight, has taught them the benefits of more civilized remedies and they will take any dose given them by a white man.

The houses of the Atnatánas are of two kinds, viz, permanent and temporary. The former are intended for winter use and are annually occupied during that season, while the latter are extemporized at any place where game may be found. The photograph of the house at Taral fairly represents the winter house of an Atnatána. In plan it is about 18 feet square, is built of spruce poles and slabs in a loose style, and is covered in with spruce bark. In some places moss is used to help to make it close. The walls under the eaves are nearly 4 feet high; about 3 feet from the ground around the inside is built a shelf 4 or 5 feet wide, which serves the double purpose of a seat during the day and bed at night, the space under this being boxed in with vertical slabs and used as a storeroom and sleeping apartments for women, children, and pups. The roof is provided with a large hole in the middle, to permit the escape of smoke from the open fire on the floor. The entrance to the house is through a small "storm shed," about 2 by 3 feet, protected at the outer end by an undressed sheep or goat skin. Opposite this, at the other end, near the floor, is a round hole about 15 inches in diameter, which is the entrance to the sleeping room and bath house. This is about 10 feet square and 4 or 5 feet in height, nearly all of which is under ground, and is lighted by a small aperture over which the intestines of the bear are stretched. The sweat bath is so highly prized that every permanent house of the Midnoóskies and most of those of the Tatlatáns are supplied with the necessary room, the heating of which is quite simple. A large pile of stones placed on a close frame of logs in the main room, after the manner of an old-fashioned limekiln, are heated, then transferred to the sweat room by means of two sticks used as tongs. The circular aperture is closed with a kind of tompion, and water is then poured on until the necessary amount of heated vapor is obtained. The idea of building this adjunct to the houses came through contact with the Russians, with whom it is a religious as well as a hygienic measure, and is practiced as far north as the Alaskan range. Beyond this it is not seen until the lower Yukon is reached. The temporary or hunting house, always built of poles and boughs of spruce, cottonwood, etc., is rectangular in plan, with a passageway through the center. Two sides only are used, and in consequence the ends and upper part are scantily covered. A log placed on the fire extends sometimes several feet beyond each end. A moose or caribou skin, in lieu of cotton cloth used by their more civilized brethren, is occasionally used to help make it waterproof directly over the sleeping places. Tents are not as yet a part of their possessions, nor is metal of any kind employed in assembling



A MIDNOOSKY HOUSE.

the different parts of the houses, willow withes and rawhide thongs answering their present requirements for this purpose. In general, the winter house, being on the river, may be said to be occupied during the salmon season, and until February, when the occupants depart for the head waters of streams, where they hunt and trap and improvise summer houses.

Never have I seen Indians more devoid of luxuries than are the Atnatanas. The wealthiest count only the following vessels and utensils in their subsistence departments: One to three large kettles, one teakettle, one frying pan, several wooden trays (native), several knives, generally home manufactured, horn spoons, and two or three cups. In but one place did I see any pretense of furniture, and that was a peculiarly made box to put the teacups on. The average head of family dispenses with all the above save one kettle, one or two wooden trays, a knife or two, and possibly a small cup, which he invariably carries while traveling. I found no vessels for boiling or holding water that had been used prior to the introduction of modern ones.

Their clothing consists ordinarily of two garments, trousers and boots forming one, coat or parkie the other. In the winter this is sometimes supplemented by a shirt made of rabbit skin. The coat is usually without a hood attachment, differing in this respect from that of the Eskimos, the headdress being made from marmot or squirrel skins. The principal decorations of the wearing apparel is of beads, of which those one-eighth to one-fourth of an inch in diameter are especially prized. Very seldom are porcupine quills utilized for ornamentation.

The men have both ears and nose pierced, the women the former only. In the nose rings made of shell or metal are worn, some of which are 1½ inches in diameter. Sinew suspends the ear ornaments, which are made of elongated beads. To be thoroughly en règle, a little red paint must be applied to the face. This applies more particularly to the women and children than to the men. Nicolai alone was never seen to use paint or ornaments of any description; he preferred to adopt the style of the white men. The beaded knife scabbard attached to the neck is considered indispensable to the well-equipped Atnatana, who does not take it off day or night. In addition to this, the tyones and wealthy men wear a beaded ammunition pouch. Bracelets and finger rings, likewise tattooing, are almost unknown to them. Combs made of the hoofs of the moose are owned by some, while many keep the hair in condition by dexterous use of the hands. They are very fastidious with respect to the hair, which, be it said to their credit, nearly always appears neat, a shaman's excepted. That of the women and shamans is worn long, while many of the men in early summer cut it straight around at the height of the middle of the neck.

The unit of measurement with them is the distance between the tips of the fingers, the arms horizontally outstretched. I have frequently seen them measuring timber for a baidarra or the length of rope or thongs with this unit.

Beads and ammunition are the mediums of exchange used by the intermediate men in obtaining the furs that are carried to the trading stations. Nicolai leaves at his house on the Chettystone River during his absence at Taral beads, caps, and powder for the "Calcharnies,"[1] who arrive and deposit an equivalent in furs, tending to show how definite is the relation between articles of commodity and prices paid for them, and also the mutual confidence amongst themselves.

Their bows and arrows are quite similar to those formerly much used by the Yukon natives, though they are perhaps a little better finished. The material for both is birch, which is subjected to a peculiar process of seasoning, which might be called tempering. A rough slab about 5 feet long is blocked out of green birch with the small ax in possession of nearly all; then the knife is used to bring it down to dimensions not exceeding an inch or inch and a half in cross section. This rod is alternately put in the fire for a few seconds and then worked awhile with the knife until it has nearly attained its final dimensions, when it is placed where the smoke can envelop it. It may remain at this stage of the process several weeks before being again subjected to the fire and the knife. When finally tempered a bow 1 inch by ½ inch in cross section requires a strong arm to spring it. I have seen splendid ramrods made of very crooked timber in the same manner.

[1] The term "Colcharney," or "Kolshina," is of Russian origin, and is applied by the Midnooskies to all people not belonging to their tribe.

Bows and arrows are yet largely used by them, though they are being rapidly superseded by the small bore, double-barrel, muzzle-loading shotguns, of which there are two grades, one very inferior, the other good, with laminated steel barrels. Neither of them exceeds 5 or 6 pounds in weight. They fire out of these guns pebbles and bullets of lead or copper. The copper bullets are claimed by them to be superior to the lead ones for large game, such as moose and bear, for the reason, they say, that the copper ones will always break the bones, while the lead ones will not. The copper bullets in use on the Chettyna River are formed by hammering.

Judging from the weapons owned by these natives, and from their docile and mirthful characteristics, I should not consider them a warlike people.

In building their houses the only implements used, besides the ax and knife, is an adz made by securing to an elbowed stick with rawhide strings a flat piece of iron tempered by themselves.

They are by no means of an inventive turn, many of them obtaining their snowshoes from the Colcharnies; nevertheless they make their toboggans and sleds, which possess the valuable qualities of lightness and durability.

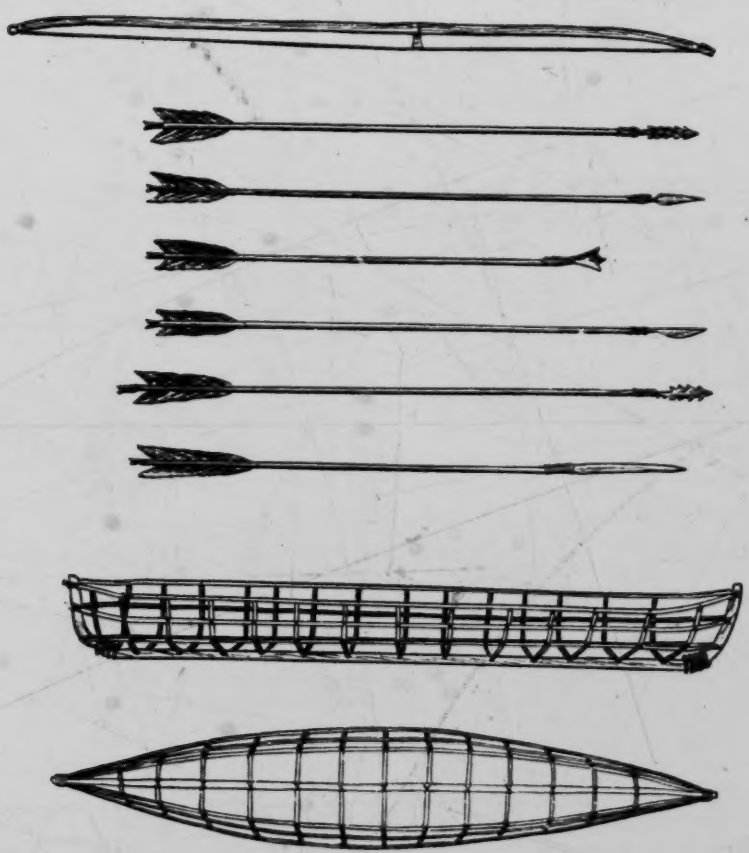
As before stated, their routes of travel are chiefly on or near water courses. When a long journey down the river is contemplated or a trip to Nuchek is decided upon, a skin boat is built; but if the distance be short, a raft made of four logs fastened with willow withes is constructed. In ascending the river with a boat only one method can be used, that of "cordelling." A party of Tatlatans were passed above the Chestochena en route to Taral in a baidarra for the fishing season. The skins of their boat were to be dressed at the destination and made into clothing, and the return trip was not contemplated until the ice had formed on the river, thus enabling them to sledge back. There is a trail along the river from Taral to the mouth of Slahna River, though not always on the same bank of it. In some cases it is 2 or 3 miles from the river.

To every member of a family belongs on an average three dogs, which are used for hunting moose and bear and other game, and for carrying packs. They are a source of great annoyance in the vicinity of rabbit snares unless kept at the house, usually by shoving one or both front feet through a string tied around the neck. As pack animals they are exceedingly valuable to people situated as their masters are. They do not average more than 18 to 20 inches in height, yet they can carry for short distances 30 to 33 pounds, and day after day 25 pounds. I can heartily recommend a pack train of these animals for journeys where the greatest transporting power consuming the least quantity of food is desirable. These dogs are never harnessed to the sleds, which the natives haul and push, but transport their burdens directly on the back. The men very seldom carry packs other than their arms and bedding, the work of transportation being assigned to the women, who pack themselves and manage the train of dogs. Canoe transportation in none of its forms is attempted on the Copper or any of its tributaries, nor is it probable that it ever will be, owing to the remarkably rapid current produced by the unusual fall in the river of 3,160 feet in 330 miles.

The chief amusement of these people other than eating, and the one they always resort to when hunger is satisfied, is singing. Unassisted by any musical instrument, not even any form of the tum-tum, nearly all join in the songs, usually led by the young men and boys. These are numerous and varied in character, those intended for courtship being much less exciting than the more epic ones. Singing is frequently indulged in while enjoying a meal, and all the bodies may be seen keeping perfect time to it. The children are taught to sing almost as soon as to talk. When dancing accompanies, its violence is in direct proportion to the stress of voice.

The spoken language is markedly accented, and seldom are more than three consecutive words uttered with the same intonation. Most dissyllabic nouns and many adjectives are accented on the last syllable. The practice of delivering orations is as frequent amongst them as among the Sioux or Cheyennes. The following limited vocabulary may serve to give a faint idea of the nature of the language. The annexed numerals of the White Mountain Apaches, as obtained from Lieut. T. B. Dugan, U. S. A.,[1] who was ten months on the San Carlos Reservation, shows an astonishing similarity to the same of the Atnatánas, which I trust may lead to a more

[1] I am under obligations to Lieutenant Dugan for much valuable assistance in making the report.



BOW AND ARROWS AND MIDNOOSKY BAIDARRA FRAMES.

thorough investigation of the matter.[1] On further comparison of our respective limited vocabularies a few nouns almost identical in sound and meaning were found to exist.

English.	Midnoósky.	English.	Midnoósky.
Man	Keek.	Food	Teechin.
Woman	Sekál.	House	Hoonák.
Child	Skunkál.	Sweat-house	Sayzéll.
Dog	Sklekáy.	Grease	Dalkák.
Salmon (small)	Slukkáy.	To-day	Tétagin.
Salmon (large)	Sukacháy.	To-morrow	Minta.
Moose	Tenáyga.	I	Se.
Caribou	Konnál.	You	Nin.
Sheep	Tebáy.	None, nothing, few	T'kwúlly.
Goat	S'bai.	Far, a long distance	Kooteshit.
Wolf	Tekánt.	A long time	Siyoó.
Fox	Nukléksy.	A short distance	Cuttlestée.
Lynx	Noótëay.	Good	Walláy.
Martin	Choóga.	Bad	Katáhwot.
Black bear	Nellây.	Large	Traykchá.
Brown bear	Cháhny.	Small	Tulchóne.
Rabbit	Gak.	Plenty	Keelán.
Marmot	Chiléss.	Hot	Tebáy.
Smooth ground	Nent.	Tired	Tazée.
Mountains	Trollál.	Hungry	Deschâne.
Wood	Chitz.	To go	Hoóna.
Ice	Tin.	To come	Ah'ny.
Lake	Bin.	To sleep	Nastalá.
Water	To.	How many?	Dóna keelán?
River	Na.	Give me some water	To unto.
Sun	Niái.	Mount Wrangell	Kēúnchilly.

English.	Midnoósky.	Apache.	English.	Midnoósky.	Apache.
One	Suskai	Daschlai.	Six	Kistán	Goostán.
Two	Natáyky	Nakee.	Seven	Konsárry	Goosétty.
Three	Tagy	Tagy.	Eight	Klahinky	Saybee.
Four	Dinky	Dingy.	Nine	Zutlakwalo	Goostai.
Five	Ahtzunny	Schlai.	Ten	Lahzún	Gooneznún.

Notwithstanding the fact that women are decidedly in the minority among the Atnatánas, polygamy is practiced to a limited extent. How far they observed the laws of consanguinity in their marriages I do not know, but that an occasional Midnoósky marries a Tatlatán is a fact, brought about possibly by that desire to avoid marriages of relations. The wives are treated with very little consideration, and are valued in proportion to their ability to pack and do general work. They and their children are always left in destitute circumstances at the death of their husband, however wealthy he may have been. This arises from the custom of distributing among the tribe at his death the property, the accumulation of which seems to be a great pride because the demonstration at the obsequies will be in proportion to the wealth of the deceased. The oldest son, however young, becomes the head of the family at the death of the father. The treatment of adopted children is not different from that of the natural heirs. Very small children are carried in a kind of birch chair or cradle, the legs hanging over, while older ones sit on the pack, with a leg passing on each side of the mother.

The social organization seems to be divided into the following classes: tyones, skillies (near relatives of a tyone), shamans or medicine-men, and vassals of varying degrees of servitude. In all assemblies seats are rigidly assigned according to rank, which is well established among them.

[1]Since writing this I have learned from Mr. O. T. Mason, Director of the Ethnological Department of the Smithsonian, that the relationship of the Tinneh family with the Southern Indians was discovered by Mr. Turner many years since.

The tyones would barely condescend to consider any of us their equals, nor did they fail to express disgust at seeing the head of our party carrying a pack or pulling on a rope.

Among the Midnoóskies the influence of the shamans is much less than with the Tatlatáns, a fact due, I suppose, to contact with the Russians. Nicolai, an influential chief, would not tolerate them, though he himself claimed to be able to perform wonderful cures; certainly many natives, far and near, believed him. His power is supposed to come from the church (Greek), of which he is an apostle. He wears on his hat a Greek cross as talisman, and has a small quantity of paper and a pencil, with which he pretends to keep a record of all matters of importance to his people. It is not strange that with his unusually keen perceptive faculties he deceives his neighbors, as shown by the following: At Kheeltat's, about 350 miles from Taral as we traveled, was seen a native carrying a highly valued brass cross and some hieroglyphics, both made by Nicolai, who had doubtless received a liberal allowance in furs for them. Some have such confidence in his healing power as to send the garment of a sick child many miles to him in order that he may sleep on it. Liebigstag, a tyone who has several shamans in his following, caused all to absent themselves from his camp on hearing of our near approach. Farther up the river, however, they are comparatively numerous, and are detected by the uncombed, uncut condition of their hair. They are nonproducers, whose missions are those of priest and prophet of the most primitive style.

The skillies are necessarily many, and not a few of them have vassals at their beck and call. I have seen one 14 or 15 years of age, sitting within a few feet of the river, order a man 6 feet high, a vassal, to bring him water. These menials are used for all kinds of work, and are as completely under the control of their masters as they possibly could be, yet I never heard of corporal punishment being administered to them. It is but natural to suppose that a threat of depriving them of food or shelter in their poverty-stricken condition would be sufficient incentive to urge them to any length of obedience.

A family is driven to a state of dependency at the death of its head, not only on account of all property being distributed, but also from the fact of the house being burned. The dead are put under the ground and the site marked by a square frame, about 3 by 5 in plan, placed above. There seems to be no special ceremony attending marriage; a man possessing a few kettles, etc., is always eligible, and when he meets his fate takes her.

TANANA RIVER NATIVES.

What has been said of the Atnatánas will, in a large measure, apply to the natives of the Upper Tanana, though the frequency of the visits of these latter to the Yukon River has had considerable influence in modifying their customs and dress. They have almost entirely ceased to wear nose-rings, and but few wear ornaments in the ears. Opportunities for observing the customs of these people were not as favorable as were those for studying the Atnatánas, on account of the hurried manner in which we passed through the Territory.

The natives of the Upper Tanana call that river Nabesna. For uniformity and by analogy to the term applied by Copper River natives to themselves, I have called them Nabesnatánas. For the same reason I have applied the term Tananatánas to all the natives of the river. The natives of the lower part, embracing two or three small tribes, each with a name, have for convenience been called Nukluktánas. The name suggests its applicability. These natives are not unlike those around Nuklukyet. Manook, the interpreter at Fort Reliance, gave me the following names for the tribes along the Tanana. I record them for what they are worth. This man was never on the Tanana River, though he is considered one of the best interpreters of the many dialects of the Tinneh language. These names are supposed to be the ones applied by the tribes to themselves. Beginning near the upper waters he says are the Nutzotin, including Nandell's and Tetling's following; after them, in order, are the Mantotin, Tolwatin, Clatchotin, and Huntlatin. The termination "tin" is but another form of the word representing "people." The words tena, tenna, tana, tinneh, tineh have all been used to mean the same, and the word Dené, as applied to some of the people of the Hudson Bay country, is intended to represent the French phonetics for a native word meaning "people."

The Tatlatáns are not only in habitation an intermediate people between the Midnoóskies and Nabesnatánas, but also in custom and language. There are some words common to all of them, though a marked difference in the accentuation is observed between that of those north of the range and that of those south of it. A peculiar drawling tone characterizes in a marked degree the Nabesnatánas, in a slight degree the Tatlatáns, while the Midnoóskies are distinguished by a most energetically accentuated language. These last converse with the Tatlatáns with less ease than do the latter with the Nabesnatánas, who readily communicate with the natives around Fort Reliance and Fetutlin, on the Yukon.

I estimate the entire population of the Tanana River and its tributaries to be between 550 and 600, though no very accurate idea can be formed of the number of a people living as they do without visiting their settlements, very few of which are on the main river. Around Nandell's and Tetling's we counted 40 men, 32 women, and 25 children; around Kheeltat's, 28 men, 18 women, and 6 children; a total of 149. Between Kheeltat's and Toclat River there were but two camps, each containing about eight souls. Below Toclat we passed but one camp, that of Ivan, consisting of 31 men, 18 women, and 20 children. The entire number of natives seen on or near the Tanana was 232. Between Kheeltat's and Delta River, marked on the map as "head of navigation," the only indication of natives, save an occasional blazed tree, is the camping ground at the mouth of Volkmar River. Below Delta River are frequent camps, many of which are doubtless used by natives during the salmon season.

Should the Nabesnatánas descend the Tanana to its mouth for trading purposes, a return could not be made until the winter time; this journey, however, is not a necessity with them, on account of their ability to obtain ammunition from Fort Reliance or Fetutlin by a portage of six days. It is not more probable that the Nukluktánas would permit them to pass through their territory than that they would those natives living between the Tanana and Kuskokwim rivers, who must always trade through intermediate men.

That salmon do not reach the upper waters of the Tanana is rather singular, and can not, I think, be alone attributable to the rapids along its course. The absence of salmon causes the natives to depend for sustenance on the smaller fishes previously enumerated, and large game, much of which is caught in snares. It is a custom of theirs to have long lines of fencing so built of brush and poles that caribou or moose can not get through it. At intervals a gap is left, in which a rope snare is placed. By this means a large part of their subsistence stores is obtained. A miner informed me that while prospecting between the Yukon and Tanana Rivers he found a "game fence" 30 miles long.

The Tanana natives have more bead work and are perhaps more skilled in its manufacture than any people seen by us in the Territory.

In general appearance and manner the natives of the Lower Tanana strongly resemble the Unakhotánas of the Yukon, especially those near Nuklukyet. It is said by the traders of the Yukon that the natives at Fort Reliance and of Nuklukyet understand each other, and also the Nukluktánas and Nabesnatánas, but none can understand the natives living in the vicinity of old Fort Yukon. This would seem to indicate that the Tanana River and the Yukon below the mouth of same were peopled from the upper waters of the Yukon, or else the migration was up the Tanana, thence across to Fort Reliance, leaving the most northerly part of the Yukon River to be peopled by natives from the direction of the Hudson Bay Territory. The Nabesnatánas both pack their dogs and use them in sleds, whilst the Nukluktánas, like the Yukon River natives, seldom use them otherwise than in sleds. These sleds are similar to those used on Copper River. Their dogs, however, are much larger than those of the country south of them, owing to the introduction of English breeds.

These people, like all the natives of Alaska, are natural traders, as evidenced by the number of hands through which an article will pass before being rendered unfit for use. A shirt originally belonging to the Abercrombie party was obtained at Alaganik by a Copper River native, who traded it to one of his fellows. This one wore it as far as Batzulnetas and there traded it to a native accompanying us, who carried it over Miles's Pass to Nandell's, and it was there again disposed of. In the meantime it had twice changed hands amongst the native members of our

party. Had it not become worn out it might have found its way to the Yukon. We saw at Tetling's house an ax with a Montreal brand on it, also a pair of sailor's trousers and a Thlinket blanket, both of which doubtless came from Chilkat Inlet, the former primarily from the man-of-war stationed at Sitka.

Should the natives of the Tanana or Copper River commit outrages upon the whites who may be making their way into the interior, of such a nature as to justify the intervention of the military, many difficulties would be encountered before redress could be obtained. To stop the sale of ammunition and arms would be a sad blow to them, but a decidedly negative retaliation. To get a force into the interior marching would be necessary, and could be accomplished more easily than the party could be subsisted after its arrival at its field of action. To ascend either the Copper or Tanana by steam is out of the question. To reach Nandell's, on the north side, or Batzulnetas, on the south side, by cordelling up these rivers, would be to arrive at either place without subsistence stores. To set out from the mouth of either river when there was ice, with sleds well packed, would be to come to grief for want of food before these head waters were reached, if an attempt were made to subsist entirely on the stores started with. This would be especially true in the case of the Tanana. The most feasible method would be to ascend the Yukon as far as Fort Reliance by steamboat, and to pack the stores across to the Tanana on the backs of men and dogs. Even after that river was reached by this method the stores would soon be exhausted unless frequently depots were made along the route, and additional supplies sent forward continually. If the objective were the lower part of the Tanana River, a steamboat would solve the problem of transportation. If, however, it were the Copper River, the portage from Fort Reliance could be continued across the Alaskan Range. Once on the Copper, food in the form of salmon would be abundant, and a severe retaliation could be inflicted by patroling the river, thus preventing, if possible, the natives from taking fish during the summer. By this means a large number of them would perish the following winter.

From extensive observation and from conversation with men who have traveled extensively in the Territory, I am of the opinion that pack animals other than dogs or reindeer are not practicable anywhere in the interior save in an occasional locality, and then for a short distance, not exceeding a few miles. That other than these would die during the winter, unless special provision were made, there can be no doubt. The footing in many places would render an ordinary mule pack train of as little or less value than a flotilla of small boats. Grass in these high latitudes has given place to a deep bed of moss and lichens, which it is hardly probable would subsist horses, mules, or oxen. Occasionally small sections of the Territory are seen where the growth of grass is luxuriant, yet such an occurrence is generally accompanied by the sight of marshes. It is a significant fact that the burning of the moss gives rise to a hardy growth of grass, which practice may in the future be advantageously used.

In view of the above considerations, special care should be taken in selecting a force to be sent into this country. Each man should be chosen for his obedience, strength, endurance, and ability to live in a country where food is difficult to obtain; in other words, each should be soldier, hunter, packer, and his own commissary. I know of no class of men so capable of meeting these conditions as mineral prospectors, whose occupation frequently requires the exercise of such accomplishments.

Strategically considered there are no people within the boundaries of the United States so favorably situated as the above-mentioned tribes of the Tinneh family. Gifted by nature with the skill and cunning of their southern relations, and inhabiting a much more inaccessible and foodless country, depredations and other crimes could be committed with correspondingly greater impunity.

NATIVES OF THE KOYUKUK RIVER.

Notwithstanding the vast extent of country occupied by these people, they differ so little from each other that the term Koyukuns, previously used, may with propriety be applied to all of them. They belong to the Tinneh family, and possibly the term Koyuktána or "Koyukuk-Khotana" would, for uniformity, be more properly applied.

The river on which they live possesses a moderate current, is free from falls or rapids, hence offers a ready and easy way for communication; yet I doubt whether the natives on its upper waters will descend it to its mouth so long as they can trade at Nuklukyet or meet the fur traders at Konootena village.

Their most northern settlement, which is in approximate latitude 66° 44′, longitude 150° 47′, is on the Nohoolchintna near its mouth, while the most southern one is near the junction of the river with the Yukon, more than 500 miles below. All of these people readily converse with the Unakhotánas at Nuklukyet and Nulato, though some words are entirely different from those used at the nearest points on the Yukon to represent the same idea.

In appearance they differ so little from their Yukon relations that a description of them seems hardly necessary. They are on record, according to all persons who have written of them, as being warlike people, due perhaps to their participation in the Nulato massacre, previously mentioned. Those living on the upper part of the river are too poverty-stricken and miserable to attempt anything that would not assist them in obtaining food or clothing. They report that a severe epidemic carried away many of their number in the winter of 1882–83. At the only villages above Batzakakat, viz, Konootena and Nohoolchintna, are 11 men, 4 of whom, together with 1 woman and 1 child, are deaf-mutes. We did not see all of the inhabitants of the last-named village, so it is possible there may be others similarly afflicted.

The total number of Koyukuns, estimating the settlements on the Hussliakatna and Cawtaskakat, as containing 14 and 10, respectively, is 276. This is a more accurate census than can usually be made of the natives. Besides these there was an Innuit family of 5 living temporarily on the river. To show how the Koyukuk is populated, I cite the following: Between Red Shirt's village and the extreme northern settlement, a distance by the river of 363 miles, were 13 settlements, temporary and permanent, with inhabitants numbering 164; between Red Shirt's village and the mouth of the river were 5 settlements, containing 65 souls; while at his village alone were 45. Of this population it is noticed that 66 are men, 79 women, and 129 children, a fact that shows that the division as to sex is very different from that usually found among uncivilized people who struggle so hard for existence.

The principal subsistence of these people is fish, which includes several varieties besides the salmons, chief among which, in point of numbers, is the dog salmon. They bemoan most bitterly the scarcity of game, and at several settlements they endeavored to purchase a new caribou skin, part of my bed, to use in making winter clothing. The existence of a people living under such adverse circumstances as do those of the upper part of the river can not be of long duration. Before the 12th of August they had had a warning of winter in the form of a snow squall.

Many of the Koyukuns are armed with old-fashioned rim-fire Winchester magazine rifles, caliber .44, which have been obtained, through the Eskimos, from whaling vessels. While possessing this gun, it is seldom that it can be utilized for want of cartridges. Besides these they have shotguns, usually the single-barrel muzzle-loader, and bows and arrows.

They make portages over the mountains to the north from Fickett, Allenkakat, and Dakliakakat rivers, presumably to the Colville and Kowuk, or Holootana River, as the Koyukuns call it. They also portage to the Tozikakat and descend it to the Yukon, or else use the trail we followed from the Yukon. Those lower down pass to the headwaters of the Kotzebue Sound, where they exchange commodities with the Eskimos. Natives from Red Shirt's village have occasionally gone as far as St. Michael to trade. Now that Nulato is abandoned, such journeys will be almost a necessity if they desire to trade during the winter season.

What may be said with respect to the education of the Yukon natives will equally apply to these.

I know of no place in the possession of the United States where charity could with more justice be dispensed than among these people and those of the Lower Yukon. If the Government desires that this people should continue to exist, some provision for them should soon be made. Fish food is sufficiently abundant to support them, but the prospects of obtaining clothing material are rapidly growing darker. It is a mistaken idea, that of supposing the interior of Alaska possessed of much large game. To show the scarcity of such, I will say that during our

entire travel from latitude 60° 20′ to 50 miles within the Arctic Circle, thence to St. Michael, over a route covering 18° of longitude, we did not see a single moose or caribou, and but one bear, a small black one. During the greater part of the winter of 1884–85 Messrs. Mayo and La Due, who wintered at Fort Reliance, had rabbits only for meat, notwithstanding repeated efforts were made by themselves and their Indian hunters to obtain large game.

THE NATIVES OF THE YUKON.

The natives of the Yukon River, from the mouth of the Tanana to the sea, have been described by Dall and others, and the term "Ingalik" has been applied to those living between Nulato and that part of the country occupied by the Innuits, or Eskimos. This word is of Eskimo origin, and was originally used by them to represent all the inland people. The name given by the Ingaliks to themselves, however, is Kaiyu-Khotana, which means people of the lowlands (Dall). Their appearance shows them to be the Tinneh family, modified by a liberal infusion of Eskimo blood.

Their continued intercourse with Russians and whites for fifty years has had its effect in altering their customs, though it is not evident that the association has been beneficial to them. With the introduction of firearms was begun an extermination of the once numerous herds of caribou, which supplied clothing and a liberal part of their food. The scarcity of these animals now causes a greater dependence on the traders for clothing and at the same time deprives them of a possible source of revenue from the sale of its meat and sinew. They must now depend almost solely on fish and berries to continue their existence as a people.

Beginning at Nuklukyet and descending the Yukon, the increase of poverty and squalor is very noticeable. A marked loss of self-respect is also apparent. Their poverty-stricken, humiliated condition is taken advantage of by the traders, who demand from them much greater prices for the usual commodities than are obtained from the bolder and more independent natives who assemble at the trading stations farther up the river. Had these people a sale for the thousands of excellent salmon that yearly ascend their rivers their future would not be so dark as it now necessarily is. Between Nuklukyet and Yakutskalitnik I saw many natives who barely had sufficient material to hide their nakedness, and furthermore their prospects of obtaining winter clothing were indeed meager. The destruction of the large game has been very rapid, and whether or not these natives will survive the resulting destitution without governmental interposition is doubtful.

The Ingaliks constitute the most numerous tribe of the Tinneh family in the Territory of Alaska, and may be estimated to number 1,300.

I have used Dall's designation for the natives living between the mouth of the Tanana and Nulato, Mnakho-tana, which includes the inhabitants of the two last-named places. They number about 550 souls. The blending of these natives with the Ingaliks is so uniform that no exact line can be drawn separating the two. Both are called by themselves Yukoni-khotánas, which means people of the Yukon River country.

Neither these nor the Ingaliks are governed by the tyone system. A stronger influence is probably exerted by the shamans, who include in their numbers both sexes. It will require a long time to eradicate the much-abused faith imposed in them by their parishioners. Manook, a sensible Indian, who speaks English, was, to judge from his conversation, much opposed to shamanism. His child at Nuklukyet having become seriously ill with "summer complaint," he applied to me for medicine, which I gave. Unwilling to await results, and probably having become convinced that the child was too sick for white man's medicine, the shaman was called about midnight to begin his incantations. These were continued every few nights until the child died. The shaman in attendance was a smart, fine-looking young man, reputed to possess great powers. I give below his method, which, though homeopathic as far as relates to the child, was decidedly allopathic as to himself. A piece of canvas was spread on the ground, around which all the natives at the village sat singing an intermittent, spirited chant or dirge. On the canvas was the shaman, covered with a blanket, with which several Indians were trying to conceal and keep him on the canvas, while he was groaning, yelling, and indulging in all sorts

of contortions, all the while keeping time with his noises and kicks to the spasmodic singing of the surrounding group. At one corner of the canvas Manook, with his child in his arms, was sitting. After writhing and groaning under the blanket for an hour or more, the shaman thrust his feet into Manook's lap, under the wraps of the child. He lay in that position for some time, when he broke away with the disease of the child in his possession. Then began a terrible struggle with the disease in order to drive it back into the keeping of the evil spirit. During this contest he tore his shirt from his body, floundered to the top of the blanket, and seemed to suffer the most excruciating pains. At the end of about two hours, when his exertions had become less violent, one of the natives seized him, drew his head into his lap, blew into one ear, then into the other, and then pressed hard on the top of his head. The shaman remained in a stupor until a second Indian jumped up and gave him another pressure on the head, which completed the process of resuscitation and enabled him to immediately arise and join in the general conversation. At another time he made a medicine while under the blanket and fastened it around the child's neck, before coming from under his cover.

The result of the teachings and example of Mr. Simms, a deceased missionary of the Church of England, is plainly noticeable, and as valuable to the traders as the natives, all of whom express a warm feeling for his memory. There are now, besides the hundreds of Indian children along the Lower Yukon, the Lower Kuskowim, and the coast north and south of St. Michael, twelve or fifteen half-breed children of traders living at present on the Yukon, who are very desirous that their offspring should be educated, and who affirm that the Indian parents in a large measure wish the same advantages for theirs. The only place of instruction available is the Mission, 217 miles from the coast, where the preceptor is a half-breed Russian priest, incapable of teaching English.

The question of an industrial education, the system of instruction now supposed to be best for Indian children, for the Yukon River natives, is certainly a subject for consideration. The question naturally suggests itself, what industry can be taught children living in such an inhospitable climate as theirs, where winter begins the first of September and ends the middle of May, when the ice goes out of the river? The primary object of the education should be to teach them more feasible methods of living. If it be proved that their country is capable of producing the hardy vegetables and grain, or that it is rich in mineral resources, then their education will find fields for its application. If, however, it continue in the future what it has been to them in the past, valuable only for its fish and game, instruction of any kind would be of doubtful value. For now, after generations of experience, do they not better understand securing their fish and animal food than white men can teach them? Of the former they obtain all they desire, while of the latter they secure yearly all that can be and more than should be taken. Their houses are quite in keeping with their mode of living, and good enough for their present surroundings; why change them? Without the further development of their country, or financial assistance, I can not see that the benefits of an industrial education would in any manner be for their welfare. The education of the natives in southern Alaska, whereby they are better prepared for several industries which are established in or near their homes, is quite a different affair. In their own country there is at present no employment open to the Yukon natives save the securing of food and the trapping of a few fur-bearing animals. The policy of educating them and sending them to another part of our country for employment would be an extremely questionable one, as would be that of educating them elsewhere and sending them back to their people. With plenty of food and warm clothes there is no reason why these people, who have for generations inhabited the Yukon, should not continue to so do; but with food consisting of fish only, and a scarcity of clothing material brought about by an improvident destruction of large game, their existence from a sociological point of view is not long.

If tribes of Indians living in the West and Southwest of the United States, where the climate is genial as compared to that of the interior of Alaska, and where food products are comparatively easily obtainable, receive, as a matter of right or policy, support from the Government in part or whole, certainly these people, nearly destitute of clothing, should at least have assistance in that direction.

That their moral and spiritual welfare could be much improved by schools, and that their ideas respecting sanitary laws could be advantageously modified, is not to be questioned; yet by all means let such changes be accompanied with presents of wearing apparel. The traders informed me that there has already been much suffering during the winters from want of proper clothing.

The entire number of souls on the Yukon above Nuklukyet is estimated at five or six hundred; but these have as yet not seriously suffered for want of skins for clothing material. In general appearance they resemble the Nabesnatánas.

ESKIMOS, OR INNUITS.

It is not within the scope of this report to enter into a description of the customs and manner of living of the Eskimos of Alaska, for the reason that more or less has been written about them from the time of the discovery of Stewart Island, on which St. Michael is situated, until the present time. For their description, numbers, and location I would refer the reader to the report of Mr. Ivan Petroff, special agent of the census, which is as reliable as any publication on the subject. I will say, however, that any attempt at an accurate census would require more time than was allotted to Mr. Petroff.

Captain Healy, commanding the *Corwin*, whose observations in Northern Alaska have extended over a period of fifteen years, estimates the number of Eskimos from St. Michael along the coast to Point Barrow at 3,000, and the number in the interior between these two points at 2,000. The number between St. Michael and Cook Inlet, including the interior, according to Mr. Petroff, is about 9,800.

The picture fairly represents the type. The central figure is that of a native employed by us on the Koyukuk, and who served as our pilot from the village at the mouth of that river to St. Michael. In general they live near the coast, where food is more easily obtainable, though in the interior a few were met on the Upper Koyukuk at probably the greatest distance from salt water that they are ever found. The few natives that people the Upper Kowuk and Nowatak are the same family.

Besides the foregoing, the principal natives are the Aleuts, who live on the Aleutian Islands, and the Kolóshes, or Thlinkets, who occupy Southeastern Alaska from near the mouth of Copper River to the southernmost limit of the Territory.

SOME OF THE ANIMALS OF ALASKA.

In mentioning the animals of Alaska I will begin with those used by the natives for food. While we did not see all of the forms named in the following brief descriptions in their wild states, their pelts or flesh, sometimes both, were at some time of the journey found either in the possession of the natives or the traders of the Yukon, and carefully examined. To the latter practically all the furs of the Yukon shed are carried and through them transferred to Saint Michael, whence they are transported to San Francisco.

Of the ruminants I mention first the Cervidæ family, in which the moose (*Alces machlis*) is given precedence on account of its importance as a food and clothing producing animal. It is almost identical with that found in northern Maine and formerly in northern Minnesota, and is the animal which the natives largely depend upon for fat in certain parts of the Territory. It is claimed that they seek the islands of the rivers to bring forth their young, where they have greater immunity from wolves and mosquitoes than is offered on the hills and mountains. If this be true, it is to me but another proof of the scarcity of the animal of the Territory, for our courses along the rivers were necessarily among the islands, on which we frequently landed, to find nothing more than an occasional track. The natives, like most hunters, value the nose as the choicest part of the moose, and I doubt if anyone who has tried it will question their taste.

Three forms of the *Rangifer tarandus* are supposed to be known to the Territory—the barren-ground caribou, the woodland caribou, and the reindeer—the former being confined to northern Alaska. The two latter-named species, if both exist, south of the Yukon are, to the

best of my knowledge, called by the natives by the same name—honnai. The average honnai when dressed will weigh from 200 to 250 pounds. Its horns seem to partake both of the nature of those of common deer and of the moose, the ends of some branches being flattened, while others are rounded. None of these animals are spotted, as are the reindeer of the Asiatic side, but all become very light in color during the winter. On the Copper and Tanana rivers these animals, as well as the moose, are hunted when the snow is deep and hard, with the aid of dogs, when they are brought to bay and killed at short distances. A native has, indeed, been known to run down a moose and kill him with a knife, but this is rare; they are also snared, as previously described. There is a species of deer, quite numerous, inhabiting southern Alaska and the archipelago, but it does not find its way far into the interior. It is probably the *Cariacus columbianus*, or Columbia black-tailed deer, somewhat changed by the condition of his surroundings. These constitute a large portion of the meat ration of Sitka and Juneau. I have the skin of one of these animals now in my possession, which is about the same shade of blue as the fur seal, though this color is not the rule.

Of the Bovidæ family there are two recognized species, the *Mazama montana*, or the small-horned goat of the Rocky Mountains, white in color. This animal has black horns, with little curvature, and is found on the Copper River and the Upper Yukon. The *Ovis montana dalli* is a new geographical race of the mountain sheep or big-horn. It has been described as follows by Mr. E. W. Nelson, formerly of the United States Signal Corps:

> This form can be recognized at once by the nearly uniform dirty-white color, the light-colored rump, as seen in typical *Montana*, being entirely uniform with the rest of the body in *Dalli*. The dinginess of the white over the entire body and limbs appears to be almost entirely due to the ends of the hairs being commonly tipped with a dull rusty speck. On close examination this tipping of the hairs makes the fur look as though it had been slightly singed. This form also has smaller horns than its southern relatives, but how the two compare in general size and weight I am unable to say. I name this form in honor of Mr. W. H. Dall, whose scientific work in Alaska is so well known.

Whether the big-horn mountain sheep (*Ovis canadensis*) exists in Alaska I am unable to say, but I desire to add also a new geographical race of the same. The animal in question is called by the natives tebay, and this name I leave unchanged until a specimen will have been carried out of the Territory. We killed several of these animals, one of which, a ram, had horns 20 inches long and nearly straight. Their structure was similar to that of the big-horn, but the curvature was very slight. This ram was killed on a very high point, such a place as is usually sought by them, and in its fall was sadly mangled. The head of the tebay is much like that of a Southdown sheep, the muzzle much less pointed than in Nelson's big-horn. The hair is of a uniform white, in fact, nearly equal to his snow surroundings in color, and is nearly as easily broken as that of the antelope. Next to the skin is a very fine short wool, which is very strong. In size the tebay is probably an equal of its relative, the big-horn. I saw a spoon made from the horn of one that measured 26 inches in length and 5 inches across the bowl. We were informed that some had much larger horns than the one that furnished material for this spoon. This, like most statements of natives, is questionable. The large ram and one other were killed on the most northerly tributary of the Chettystone River. The natives informed us that small tebay could be killed a few miles below the junction of the Chettystone, a fact we doubted, and hence chose to allow them the use of our carbines. They passed the night on the mountains north of the Chettyna River, and returned with four small ones that would weigh when dressed probably 65 pounds. The heads were left on the mountains, but the bodies brought in seemed identical with those obtained on the Chettystone River. Why only small ones should be found at this place in the latter part of April I can not say; yet the mountains here were not so high as farther to the east, where the large ones had been killed. The last of these animals seen or heard of by us were near the head waters of Copper River, on the divide between it and the Tanana River.

As a food-producing animal in the interior of the Territory the rabbit takes rank next. Had there been none of these our prospects would have been more gloomy than can well be described. For days and weeks almost our sole dependence was on these little animals, and during a season when they did not possess a particle of fat. They are probably the northern

varying hare, possibly a little different from those found in New England. In size they are probably intermediate between the "rabbit" of the Middle States and the "jack rabbit" of the plains of Northern United States. The ears are very long and the tips of them is the only portion of the animal that is not covered with snow-white fur during the winter. During the deep snow period their only food is from the trees, many of which are barked all around near the ground by them. During this period groves of small cottonwoods or birches are favorite resorts for them and can be relied on to furnish a meal, providing the hunter is skilled in quietly passing through timber. The polar hare (*Lepus timidus*) is much larger than the "jack rabbit" of the plains, and is generally confined to the far north of the Territory. The pelts of both these varieties of hares are largely used for clothing and blankets.

The beaver is quite universally distributed throughout the Territory, and is valuable as a food as well as for its pelt. Its habits are not unlike those practiced by the same animal farther south.

The Felicidæ or cat family claims the Canada lynx as probably the only variety inhabiting Alaska. This is the animal known in Montana as the "bob-tail cat," much larger, however, and while prized for its fur is also valued for its meat, which is by no means unpalatable, as many would suppose.

In the Canidæ family there are four varieties of foxes and two of wolves. The former are the arctic, red, cross, and silver or black foxes, valued for the pelts in the inverse order of the naming. The arctic fox (*Vulpes lagopus*), found specially in the most northern districts, is white in winter and of a bluish tint in summer. I have never heard of them south of the Alaskan Mountains. The other varieties are more generally distributed, though the trading station at Fort Reliance receives annually about 75 pelts of black or silver foxes, *Fulvus argentatus* variety, which is more than all the other stations of the Yukon obtain. The wolves are the gray and the black, both large and quite scarce. Their pelts are specially valued by the natives for trimming other furs, and, like the wolverine skins, are in such demand that but few leave the Territory, the natives being willing to give a greater equivalent in other furs than would justify their shipment by the traders.

The bear family is represented by three varieties in the interior, the black, the brown, and the grizzly, besides the white bear of the coast and northern islands. There were several hunting parties landed from the *Corwin* on Hall's Island, north of the Aleutian group, on her return, and on one of the hunts Mr. Townsend, of the Smithsonian, killed one of the last-named animals. The black bear is most frequently met, though the experience of others as well as ourselves is that it is possible to see but few of any description.

Of the weazel family I mention first the North American otter, valuable only for its fur, and generally known as the land otter. The wolverine, about equal in value to the land otter, is a rather rare animal, possessing a long, coarse fur, more highly appreciated by the natives than by more civilized people. The common mink is the most numerous of the fur-bearing animals of the interior, and more abundant on the lower Yukon than elsewhere. Next to it in numbers is the American marten, or sable, considered the unit of exchange in the dealings between the traders and the natives, and for which one dollar in merchandise, at Alaska prices, is given.

I should not fail to mention the muskrat, a variety of the mouse family, which more than once helped serve us as a meal. In size they are about one-half that of the same animal of the Middle States. Their skins are much used for blankets and parkees.

Of the squirrel family but two varities were seen, the little marmot, *Arctomys priunosus*, which forms such an important factor in clothing the natives, and a very small gray squirrel of a reddish tinge, generally found in spruce timber.

The porcupine has been previously mentioned.

For description of the sea animals the reader is referred to a report on the seal fisheries by Mr. H. W. Elliott, of the Smithsonian. The subject of fisheries has not been touched in this report, though a great deal could be said in reference to it, notwithstanding what has already been written. There is practically no limit to the quantity of salmon that can be taken in the limits of the Territory, including the coast waters and the rivers. At present the extreme low prices are discouraging to the establishments already in operation. Salmon in the San Francisco mar-

ket is worth little more than one-third the amount paid for them a few years since. The increase in the cod fisheries has been indeed wonderful, and this notwithstanding little or no efforts have been made to survey the cod banks. This industry may be said to have had its origin in 1880, since which time the statistics are quite interesting. The manufacture of oil from herring by the Northwest Fur and Trading Company is an industry of considerable proportions, and capable of much greater developments should the markets demand. I have previously reported to the Government on this establishment. When the Western country shall become as thickly populated as the most populous States the fish of Alaska will be of untold value in supporting its inhabitants.

Geological Observations.

If we inquire when those mighty masses of bold and picturesque rock, covering hundreds of square miles, were upheaved, we must look for answer to the same causes that are the foundations of the theories respecting the ranges in the western part of the United States. It is reasonably supposed that the Rocky Mountain Range in early geological history constituted the land of the western part of our country, and that the face of the earth to its west, now represented by mountain ranges and valleys, was then water.

During the Paleozoic and a great portion of the Mesozoic eras this huge chain was subjected to erosions, resulting in deposits which were upheaved in the rudimentary Sierra Nevada and Cascade ranges, followed much later by the upheaval of the Coast Range. Volcanic action and erosion have served to present them as we see them to-day. If this theory be true, it is possible that the same conditions were coexistent in Alaska, as the ranges now help to attest. The Rocky Mountains extend to the Arctic Ocean by following a course nearly parallel with that portion of the Yukon River between old Fort Selkirk and Fort Yukon, while to the south of the Yukon are the Alaskan Range, which attains its loftiest elevations in the sickle of the Copper River, and the Saint Elias Range, extending around Prince William Sound to beyond Cook inlet, its northerly limit being the Chettyna River. Both of these ranges now have active volcanoes, as did the Cascade and Coast ranges very recently. In fact, it has been claimed by some who have visited Mount Hood that sulphurous gases are yet escaping from near its summit, while Mount Saint Helens has been described by more than one eye-witness as an active volcano.

Notwithstanding the appearance of a new volcano, Bogoslov, in 1883, just north of Unalaska Island, it is supposed that volcanic action is less than existed in the Territory during its earliest occupation. This supposition is a doubtful one, owing to the fact that the records relative to the matter date back only to the latter part of the seventeenth century. More than fifty peaks are known to have at times been seen in action, and some of these that are now quiet may again become active from the old craters, as our limited records have shown, or else may form new cones, as in the case of Bogoslov, about which several persons have recently written. During our visit to that volcano it was emitting vapors and sulphurous gases in such quantities as to nearly conceal its upper portion. A few hundred yards distant was the old Bogoslov, quietly resting, as though satisfied with her offspring. Mount Wrangell, elevation 17,500 feet, was, during our stay in the Copper River Valley, continually sending up a light vapor, apparently uniform in volume, while during a great portion of the winter of 1884–85 it was, according to the only eye-witness other than natives, John Bremner, emitting grand volumes of smoke and fire, such as to present a weird and sublime picture. He claims that the fire shot above the crater a distance that appeared three times greater than the height of the mountain. Whether all the prominent peaks in this vicinity possess extinct craters could not be determined, though Mount Drum readily showed that it was an extinct volcano.

South of the Tanana River and north of the Kuskowim is an extension of the Alaskan Range containing some peaks several thousand feet higher than exist where we crossed the range; yet no volcanic actions exist.

North of the Yukon to the Arctic the ranges are comparatively low; the highest are Endicott Mountains, between the Koyukuk and Kowuk Rivers, which doubtless contain the headwaters of the Colville River. I am disposed to think that no volcanic activity has ever been witnessed in Alaska in a higher latitude than is Mount Wrangell (approximately 62° 25′ N.), notwithstanding the reports relative to the peaks south of the Tanana, previously alluded to.

GLACIAL AND DILUVIAL DEPOSITS.

Diluvium is found everywhere, and the Territory of Alaska is a striking picture of that deposited by ice rivers or glaciers as well as mountain torrents. The existence of rolled pebbles and bowlders, sometimes in huge quantities in the high banks of streams, sometimes on the tops and declivities of mountains as well as in the valleys between, their entire dissimilarity from the rocks of the country in which they lie, are geological characteristics specially noticeable in the Copper River shed.

In the study of the action of water in its relation to geological changes American students have always found an ample field at home. Not so, however, with respect to glacial actions, for we find our most exhaustive treatise on this subject confined almost exclusively to the Alps glaciers. Let our specialists in the future seek fields in our own province, where the system is probably more extensive than in any other country south of the Arctic Circle. I refer to that portion of the Territory from Chilcat Inlet up to Cook Inlet, and especially to that portion drained by the Copper River.

How far glacial action has been concerned in the determination of the topography will long be a subject for study. My observations are such as to cause a belief in an ice sheet that at one time extended from the Alaskan mountains to the coast (as to how much farther from the north it came I have nothing to say). It may at first be considered at variance with the theory of contemporary upheavel of this part of the Territory with the ranges of the western part of the United States; an examination, however, of the true condition of affairs will reconcile this. Long after the upheaval followed the glacial period, producing the ice sea, which by its steady motion to the south has largely assisted in giving the country its present configuration.

From Yukutat Bay to the mouth of Copper River is an unbroken face of ice for a distance of 50 miles. How far this extends to the interior through the gorges of the coast range is unknown, though it may be safe to consider the distance equal to that of the glaciers of Copper River from its mouth. These latter may be considered an extension of the ice fronting the coast, which the Copper River formerly flowed under. There is every reason to believe that Miles's and Childs's glaciers at one time were one and the same, an opinion that is in some way strengthened by the tradition of the natives. The most southerly point of the former on the left bank is 1 mile or less from the most northerly point of the latter on the right bank, while in the river bed between are well-worn bowlders, 8 to 12 feet in diameter, and on the left bank, below Miles's Glacier and opposite Childs's Glacier, is an enormous glacial drift, now covered with vegetation. Where it joins to Miles's it is impossible to distinguish the drift from the glacier. The flow of these is now doubtless from east to west for those on the left bank, and from west to east for those on the right bank; yet this is probably not the general course the ice masses had when they were much larger than at present. They are but a residuum of the once extensive ice fields now discharging along the paths of least resistance. Had not the climate here been moist and favorable for glacier making, the present site would have been occupied by only drift or moraine, as is the case farther north, above the Chettyna, on the east bank of the Copper River, where for many miles are terraces, large and small, the deposits of ancient glaciers. The smaller ones are so regularly formed as to leave the impression that they were the fronts of old fortifications. In Blake's Stickeen River he makes mention of the scarcity of well-defined terraces, while Dall failed to observe any in the vicinity of Sitka and the Alaska Peninsula. The source of both the Copper and Chettyna rivers are glaciers, although small indeed when compared to the ones above-mentioned.

I can only account for the remarkable width of the bed of the Copper by the supposition that it was excavated by the power of gigantic ice masses and the eroding effects of the torrent water from it. The volume of water in proportion to the width of bed is less than in any river within my knowledge, while the banks, as a rule, are steep and high. By an examination of the map it will be seen that the Alaskan Mountains form an arc convex to the northward; hence the lines of least resistance of ice masses in moving from these mountains to the southward tended to intersect in the present Copper Valley. The power obtained by the enormous flow from all sides produced the remarkable excavations cited above.

I earnestly hope that glacial action in this district will receive early attention at the hands of competent men. A simple inspection of the map of Alaska by a student of nature will show that this spot was the scene of most powerful action, the traces of which are correspondingly clearly preserved.

North of the Alaskan Mountains I failed to see any of these remarkable glacial phenomena, though from reports of miners they may be found on the White River.

MINERALS.

The minerals of Copper River have long been a source of speculation, owing to pieces of pure copper, knives and bullets of the same metal, having been brought down to the coast by the natives. Some of the specimens are supposed to be associated with native silver, and in fact I had heard of some brought down which were reported to have assayed in Boston $80 per ton in silver and 60 per cent of copper. Nicolai's house is supposed to be in the heart of the mineral region, and by him we were shown the locality of a vein which at that season of the year, April, was above the snow line. He gave us, however, some specimens which proved to be bornite, a sulphuret of copper and iron. He said the pure copper was on the Chettyto River, between his house and the central branch of the Chettyna, as well as on the other tributaries of the same. He had bullets of pure copper in his possession, obtained, he said, from the natives over the mountains, though his supply consisted of three or four. We found specimens of bornite also in the hands of the natives at Nandell's, just north of the range. I do not believe that the natives guard as a secret treasure the copper or other mineral beds, but think that they would willingly reveal to the white man their knowledge in the matter.

The two prospectors of my party found with difficulty color at the mouth of Copper River, but were not at all pleased with the prospects farther up.

In ascending the Copper River it was observed that the banks, especially the east one, about 20 miles below Taral, were a green hornblendicrock, intersected by small mineral-bearing quartz veins. These gave way to a green basalt near the southern extremity of Woods Canyon, which had at its northern end a fine quality of slate that split easily into laminæ transversely to its bed. Parts of the bluff showed more than one distinct cleavage.

A few miles from the mouth of the Chettyna it cuts through bluffs of beautiful greenstone, intersected by white veins, which appeared to be limestone. The pebbles and bowlders of this river bed are much discolored by copper stains, but not to such a remarkable degree as those of its tributary, the Chettystone. The mountains around the head waters of the latter are sandstone and felspathic granite.

A feature of some of the high banks of the Upper Copper are the strata of bowlders, many feet below the surface, and separated by a distance of 6 to 8 feet. These banks are specially remembered on account of an incident occurring at the foot of one which disabled one of my native employees. As the frost leaves the face of the banks the pebbles and bowlders become loose and start down the steep bank to the river. To pass them without injury it is necessary to be a skillful dodger. A very strong native was struck in the head by one which sent him to the ground with a profusion of blood from the nose, disabling him for further work.

On the east bank of the Copper, about 8 miles above Gakona River, is a deposit of fragmentary porphyritic rock 8 feet below the surface and 50 feet above the water line. On the Alaskan Mountains, not far from Lake Suslota, is a bed of pebbles and bowlders immediately under the vegetation.

The banks of the Upper Tanana, where there is rock, are generally composed of a yellowish granite fast undergoing disintegration as evidence of the innumerable particles of mica suspended in the river and the ever-shifting quicksands. On the lower river the rocky banks are more basaltic in appearance. There has been little or no attempt at prospecting on this river. Our party tried for color a number of times without success.

There have been within the last few years a number of miners on the Upper Yukon and its tributaries in search of gold. So far their success has been but partial; the best result that has come within my knowledge was an equivalent of $1,100 in gold and platinum, taken from a bar

in the river by two men in one season. Gold-bearing quartz of a very low grade has been found in a few places, but its value would hardly justify the working of it.

On the northern bank of the Koyukuk are indications of coal beds, as shown on the map. The geological formation of the country drained by this river is in appearance very similar to that of the Yukon from Yakutskalitnik up, so that what may be written with respect to the geology of the Yukon will in a large measure apply to it.

There are two mines in Alaska that promise well, viz, the galena mines near Golovina Bay, Norton Sound, and the gold quartz mines of Douglas Island. In a recent report to the commanding general Department of Columbia, I stated that if the cost of working the latter mine were twice that claimed, and the return of metal one-half the amount claimed, the property would be a most valuable one.

In these few brief observations I do not pretend to enumerate all the claims to mineral wealth of the Territory. The coal measures in different parts will certainly deserve consideration, and may in the future prove of great value.

The various reports relative to the mineral wealth of Alaska, some of which appear over the names of Territorial officials, are decidedly sensational and unreliable. There may be, and probably is, great mineral wealth in the interior, but as yet its location is unknown. From the nature of the country and shortness of the seasons many years will be required to thoroughly ascertain the localities of valuable mineral veins. It is not my intention to discourage immigration to the Territory, yet I would gladly warn all who contemplate it to regard with suspicion many of the current articles relative to the mineral wealth.

METEOROLOGY.

By FRED. W. FICKETT, Signal Corps, U. S. A.

The following is the report of Fred. W. Fickett, of the Signal Corps, United States Army, who was attached to the Allen expedition, upon the meteorology of the region traversed by the party, together with an abstract of his journal. It should be borne in mind in connection with this statement of Mr. Fickett, that the absence of observations between March 20 and April 8, the time occupied in traveling from Nuchek to Taral, is owing to the fact that there was an almost continuous storm of rain, sleet or snow, accompanied by a cold, cutting wind. There was no tentage to protect the party from the raging elements and they suffered greatly from cold and hunger, and before they had traversed the barren and desolate waste they were so exhausted that instrumental observations were utterly impossible.

The trip of Mr. Fickett occupied about a month when he returned to Copper River. Here the meteorological observations were continued with as much uniformity as was possible under existing circumstances, they were taken before leaving camp in the morning, generally about sunrise, and on going into camp at night, from 7 p. m. to midnight.

Mr. Fickett's hygrometer was stolen by the Indians, and the barometer rendered useless by the natives who were curious to understand the nature of its interior construction. From the date of these losses no instrumental observations were taken.

Lettuce, radishes, turnips, beans, peas, potatoes, carrots, and possibly buckwheat and barley can be raised in favored localities on the Middle and Upper Yukon and Tanana in sufficient quantities to form an important auxiliary to the fish diet of the natives, and assist in supporting those white men whom business compels to reside in that portion of the Territory.

The amount of precipitation and the humidity of the atmosphere, as evidenced by the tables, show a climate for that region north of Taral unlike that of any other portion of the Territory, and in Mr. Fickett's opinion the results that could be obtained would not justify an attempt at agriculture. In the coast regions, sunlight, that element so imperatively necessary to agricultural growth and development, is largely wanting. Here dense fog, and low stratus and nimbus clouds continually intercept their impenetrable masses between the sun's rays and those unfortunate beings whom nature has placed in these localities. The term "unfortunate beings" is used

advisedly, for it would be hard to find a more miserable and wretched class of people anywhere than those found on the coast near the mouth of Copper River. Nature has furnished them food in the marine life that fills those waters, but has left them little else to be thankful for.

The climatic conditions mentioned above are caused by the natural features of the country. It will be seen by a glance at the maps that a branch of the Rocky Mountains enters the Territory from the British possessions about 15 miles from the coast, and takes the name of Alaskan Mountains. They extend west-northwest for about 175 miles, at which point they are about 200 miles from the coast. Here they gradually turn to the southwest, and after reaching the coast are continued as the Aleutian Islands, and finally disappear in the Pacific Ocean after extending southwest about 600 miles. Another range of mountains, in which is Mount St. Elias and some other high peaks, extends from where these Alaskan Mountains enter the ocean along the southern coast and joins them again in the British possessions. The territory inclosed by these two ranges of mountains is about 100 miles north and south and 200 east and west. It is drained by the Copper River and its tributaries, the former beginning its way through the Coast Range at Wood Canyon, and emptying into the North Pacific Ocean. These two ranges are so high that they shut out nearly all the moisture from this region, both from the Pacific on the south and from Bering Sea on the west.

From Bristol Bay north for 400 or 500 miles the coast is bathed by the same warm Japan current, and the same humid atmosphere prevails that characterizes the coast climate farther south, as is shown by an inspection of Table IV; but, unlike the southern regions, this moisture is not condensed on the coast. The low coast mountains allow it to be borne up the Yukon Valley and into the interior, where it is precipitated in the form of rain and snow. Hence the 8, 12, and even 15 feet of snowfall in the Yukon Valley, as contrasted with the much less depth in the Copper Valley, as stated by Bremner, is not to be wondered at. The same contrast in the summer precipitations is shown by the records appended.

At Sitka, Nuchek, and Unalaska, owing to the proximity of high mountain ranges, a large portion of the moisture of the atmosphere is condensed, causing those everlasting clouds, and rains with an annual precipitation of from 103 to 158 inches. But on the western coast these high mountains are replaced by others low enough to allow a large quantity of this moisture to pass over them into the interior, where it is precipitated over the territory drained by the Yukon and its tributaries, and finally finds its way back to the coast again by the mouth of the former—that mighty river which for volume of water discharged is supposed to be second only to the great Mississippi on the American continent.

It is a well-known scientific fact that vegetable life requires for its growth and development heat and moisture, and heat, too, supplied by the sun's rays. In the Copper River Valley one of these elements, moisture, appears to be wanting, while in the coast regions the other, sunlight, is also wanting; hence my reasons for claiming that in neither of these regions can agricultural labors be entered upon with any prospect of remuneration. But in the Yukon Valley both these elements are present in sufficient quantities to appear to justify me in claiming, as I have, that certain kinds of the hardy vegetables may be raised there in certain localities. These claims are also sustained by the results of such agricultural experiments as have been attempted from time to time in this valley. A trader by the name of McQuisten told us that at Nuklukyet he had grown turnips weighing 6 pounds, also onions and potatoes of good size and quality. The same things have also been produced at Nulato and Fort Yukon, with the addition at the latter place of barley, which was sown and reached maturity during two successive years, the only ones in which it was tried. The grains were complete and well formed, though the straw was short.

It might at first seem incredible that vegetables of any kind could be raised in these high latitudes, where the frost king of the north is supposed to reign supreme; but when, during the short arctic summer, the giver of light and heat to this solar system ascends his throne over those northern regions, the frost king retires, and under the sun's life-giving and invigorating rays vegetable life is stimulated to great activity. On the Middle and Upper Yukon the thermometer, when exposed to the direct rays of the sun, has been known to read 112° and 115° F. This, together with the fact that at this season of the year the sun is almost continuously above the horizon, will account for the small number of days required for some of the more hardy

vegetables to reach maturity. The short summer season of these latitudes is, in consequence, more effective than the same number of days farther to the southward.

The soil is generally of a sandy or clayey loam, mixed in places with vegetable matter and covered with a thick coating of moss. At a depth of 1 to 2 feet below the surface the soil usually remains frozen the year round. This is owing to the nonconductive nature of its moss covering. But the presence of ice at such a depth below the surface would not necessarily interfere with agricultural pursuits; besides, by cultivation and proper drainage, the distance of the ice bed below the surface would be considerably increased.

Abstract of journal.

Date.	State of weather.			Remarks.
	A. M.	P. M.	Wind.	
1885.				
Mar. 20	Fair	Cloudy	E.	Left Nuchek at 10 a. m.
21	Light rain	Heavy rain	E.	Traveled all day.
22	Heavy rain	Light rain	E.	Started at 2.15 a. m.; strong head wind and heavy sea; cold.
23	....do	Heavy rain	E.	Started at 2 a. m.; blowing a gale.
24	....do	....do	E.	Blowing a gale; remained in camp.
25	Cloudy	....do	E.	Started at daylight; reached Copper River.
26	Heavy rain	....do	E.	Wind cold and cutting; some sleet.
27	Light rain	Light rain	E.	Do.
28	....do	Cloudy	E.	Wind lighter and less cold.
29	Fair	....do	SE.	Wind light.
30	Heavy rain	Light rain and cloudy	SE.	
31	Light rain	Light rain and sleet	SE.	Very cold and disagreeable.
Apr. 1	Heavy rain and sleet.	Heavy rain and sleet.	SE.	Strong wind; very cold.
2	Light rain and sleet	....do	SE.	Cold.
3	....do	Fair; cloudy	0	P. m. quite warm.
4	Fair	Fair	0	Traveled nearly all night.
5	Clear	....do	0	
6	Fair	Cloudy	0	
7	Sleet and snow	Sleet and snow	SE.	
8	Light snow	Light snow	SE.	
9	Clear	Fair	.....	Reached Taral.
10	....do	Clear	.....	
11	Fair	Fair	SE.	Cold.
12	Clear	....do	0	Warm and pleasant.
13	Light snow; fair	....do	E.	
14	Fair	....do	E.	Cold.
15	Clear	Clear	E.	Night cold.
16	....do	....do	0	
17	....do	Fair; cloudy	E.	Lunar halo, 2 p. m.
18	....do	Clear	0	
19	....do	....do	0	Nicolai's house on Chettystone River.
20	....do	Fair	0	
21	Fair	Cloudy	SE.	
22	....do	Fair	SE.	
23	....do	Clear	SE.	Very little wind.
24	Cloudy	Cloudy	NW.	Cold.
25	....do	....do	NW.	Do.
26	Fair; cloudy	Light rain and snow	NE.	Wind light and not very cold.
27	Light snow; fair	Fair	0	
28	Clear	....do	0	Solar halo, p. m.; aurora during night.
29	Light snow; fair	Cloudy	.....	Light puffs of wind up and down river.
30	Light sleet; fair	Fair	.....	Do.
May 1	Fair	....do	SW.	Warm and pleasant.
2	Light rain	Light rain	E.	Wind strong and cold.
3	Fair	....do	NE. SW.	
4	Sleet and snow	Sleet; fair	SW.	Reached Taral 4 p. m.; saw blue violet in bloom.
5	Clear	Clear	0	Barometer reads 29.50.
6	....do	....do	0	Day warm; night cold.
7	....do	....do	E.	Appearance of mosquitoes; warm; geese and robins.

Abstract of journal with reductions.

Date.	Hour.	Barometer.	Thermometer, exposed.	Thermometer, wet bulb.	Dew point.	Relative humidity.	Wind.	Weather.	Remarks
1885.									
May 8	6 a. m.....	29.15	44.5	40.5	34.5	68	E.	Fair	Cum. st.
8	9 p. m.....	29.05	49	43	34	56	0	... do....	4 cum.
9	5 a. m.....	29.10	42	39	34	73	E.	Lt. rain.	Cold rain.
9	8.30 p. m..	29.17	51	45	37	59	E.	Cloudy .	8 cum. and clear.
10	5 a. m.....	29.22	58	52	46	64	E.	Clear ...	
10	10 p. m....	29.18	48	40	26	42	0	... do....	3 cum.
11	5 a. m.....	29.20	38	31	17	41	0	... do....	Cottonwood buds opening.
11	9 p. m.....	28.80	47	44	40	77	0	Fair	7 cum. st.
12	5 a. m.....	28.78	43	39	33	68	.....	Clear ...	Day very hot.
12	10 p. m....	28.62	53	46	37	55	0	Cloudy .	10 cir. cum.
13	6 a. m.	28.75	45	40	32	60	0	... do....	8 cir.
13	9 p. m.....	28.69	48	41	30	50	0	Fair	5 cum.
14	4 a. m.....	28.69	49	44	37	63	E.	Lt. rain.	Rainbow a. m.; strong wind.
14	6 p. m.....	28.60	51.5	46	39	62	E.	Cloudy .	10 cum st.
15	4 a. m.....	28.63	54	42	20	26	E.	Fair	4 cum.
15	9.30 p. m..	28.63	46	38	23	38	0	Clear ...	
16	4.30 a. m..	28.70	49	40	24	36	0	... do....	
16	10 p. m....	28.63	48	38	18	29	0	... do....	2 cum.
17	6 a. m.	28.58	45	38	25	45	E.	Cloudy .	10 cum. st.
17	8 p. m.....	28.15	45	40	32	60	E.	... do....	Cold; strong wind.
18	5.15 a. m..	28.13	46	40	30	53	0	... do....	10 st.; cold wind.
18	9.15 p. m..	28.05	47.5	40	28	48	E.	... do....	8 cum. st.
19	4.30 a. m..	28.15	46	40.5	31	56	E.	Fair	10 st.
19	6 p. m.....	28.15	46	43	39	76	E.	Lt. rain.	5 cum.
20	6 a. m.....	28.23	48	43	36	63	0	Clear ...	10 nim.; clouds high.
20	9.30 p. m..	28.24	45	39	29	53	0	... do....	2 cum.
21	5 a. m.....	28.25	42	38	31	65	0	... do....	
21	9 p. m.....	28.03	46	35	7	19	0	... do....	Ice ¼ inch thick in tin cup during night.
22	4 a. m.....	28.03	49	40	24	37	SW.	... do....	No p. m. observation.
23	8 p. m.....	27.74	55	44	26	32	SW.	Cloudy .	9 cum.; day fair; thunder, with little rain.
24	5 a. m.....	27.82	46	41	33	61	SW.	Fair	5 cum.
24	10 p. m....	27.65	49.5	44	36	60	SW.	Clear ...	
25	5 a. m.....	27.70	41.5	39	35	75	W.	Cloudy .	Last part of a. m. fair.
25	9.30 p. m..	27.60	46.5	45	40	79	0	... do....	10 st.; p. m. showery, with thunder.
26	6 a. m.....	27.60	44	43	39	83	0	... do....	Rained some during night.
26	9.30 p. m..	27.65	46	41	33	60	0	... do....	10 cum. st.; cold and showery.
27	6 a. m.....	27.65	43	39.5	34	71	0	... do....	10 cum. st.; rained during night.
27	10 p. m....	27.58	43	39	33	68	0	... do....	10 st.; p. m. light rain.
28	5 a. m.	27.78	43	38.5	31	63	0	Fair	4 cum.
28	9.30 p. m..	27.94	41.5	38	32	70	W.	Cloudy .	10 cum. st.; day fair.
29	5 a. m.	27.92	41	37	30	65	W.	... do....	10 cum. st.
29	10 p. m....	27.90	44	38	27	51	0	Fair	5 cum.; cloudy nearly all day.
30	6 a. m.....	27.91	46	39	27	47	0	... do....	4 cir. cum.; night cool.
30	10 p. m....	27.88	46	38	37	35	W.	Cloudy .	Temp. water 43°; 9 cum.
31	5 a. m.....	27.88	53	46	37	55	0	Clear ...	Began to cloud up by noon.
31	.....	.....	.....	.....	.....	.....	0	Cloudy .	Traveled till late at night.
June 1	.....	.....	.....	.....	.....	.....	0	Lt. rain.	Light rain all of a. m
1	10 p. m....	27.40	46	41	33	60	0	Cloudy .	8 cum.
2	6 a. m.....	27.40	44	40	34	68	0	... do ...	10 cum. st.; p. m. light rain.
3	8 p. m	27.10	49	45	40	71	SW.	Lt. rain.	10 him.; rain very light.
4	6 a. m.....	27.12	49	41	28	44	0	Cloudy .	10 cum. st.; strawberry blossoms.
4	10 p. m....	26.84	41	36	27	57	0	Clear ...	At the foot of Alaskan Mountains.
5	7 a. m.....	26.84	49	41	28	44	0	... do ...	Began to cloud up early in a. m.
5	10.30 p. m.	26.53	36	27	8	30	0	... do ...	Fair p. m.; flowers on mountains.
6	5 a. m.....	26.64	41	34	19	40	0	... do ...	Clear and warm.
6	10 p. m....	26.90	48	39	22	35	0	... do ...	Do.
7	7 a. m.....	26.90	52	41.5	22	30	0	... do ...	Hot day; traveled till 11 p. m.
8	9 a. m.....	26.50	50	39	17	27	0	... do ...	Traveled all night.
9	1 a. m.....	.....	.....	.....	.....	.....	0	.....	Reached summit of Alaskan Mountains.
10	6 p. m	.....	58	56	54	87	0	Clear ...	Warm, moist atmosphere.

Abstract of journal.

Date.	State of weather.			Remarks.
	A. M.	P. M.	Wind.	
1885.				
June 11	Clear	Fair and cloudy	0	Atmosphere warm and humid; hygrometer stolen.
12	...do	Clear	0	Very warm; vegetation very luxuriant.
13	...do	...do	0	Very warm; natives appear consumptive.
14	...do	Fair	NW.	Wind strong up river during p. m.
15	...do	Clear	NW.	Air smoky; large fires to the west.
16	...do	Fair	NW.	Warm; natives appear consumptive.
17	Cloudy	Light rain	W.	Cooler; flies numerous.
18	Light rain	Cloudy; light rain	NW.	Rained quite hard at times.
19	Fair	Fair	W.	Continuous daylight.
20	Heavy rain	Light rain	W.	Rain very much heavier than in Copper River Valley.
21	...do	Cloudy	W.	Rain ended about noon.
22	Fair	Fair	W.	Wind generally up river.
23	Clear	Clear	SW.	Day hot; light wind; few cu. clouds.
24	Light rain; fair	Fair	SW.	Wind light; rained nearly all night.
25	Clear; fair	Clear	0	Day warm; mosquitoes numerous.
26	Clear	...do	0	Arrived at Nuklukyet.
27	Fair	Showery	W.	Hot; vegetation rank.
28	Clear	Clear	0	Hot; horseflies and mosquitoes very numerous.
29	.....do	Fair; showery	0	Hot; moose flies thick.
30	Fair	Fair	W.	Hot; wind light; generally up river.
July 1	.....do	Showery	W.	Very warm.
2	Clear	Clear	0	Almost no wind.
3	Fair	Fair	0	Few cu. clouds all day.
4	.....do	.....do	W.	Do.
5	.....do	Showery	W.	Rainbow p. m.
6	.....do	.....do	W.	A. m., calm; p. m., wind light.
7	Clear	Fair	E.	Rainbow, 10 p. m.
8	Fair	.....do	W.	Strong wind blowing up the river.
9	Cloudy	Cloudy; light rain	W.	Cooler; small amount of rain.
10	Fair	Fair	W.	Pleasant; less hot.
11	Cloudy	.....do	W.	Cool.
12	Clear	.....do	0	Mosquitoes a torture.
13	Fair	.....do	0	Very warm.
14	Clear	Clear	0	Hot.
15	.....do	.....do	W.	Hot; wind light.
16	.....do	.....do	0	Hot.
17	.....do	.....do	0	Very hot.
18	Fair	Showery	W.	Thunder and lightning all of p. m.
19	Cloudy	Cloudy	W.	
20	.....do	Light rain	W.	Rain began at noon; continued p. m.
21	Light rain	Fair	W.	
22	Clear	Clear and hazy	W.	
23	Light rain	Light rain	0	No wind all day.
24	.....do	...do	W.	Light wind.
25	Cloudy	Showery	W.	Do.
26	Fair	Fair	W.	
27	.....do	.....do	W.	Partly cloudy; clouds cu.
28	Fair; hazy	Clear	W.	Very warm; sand flies a great pest.
29	Foggy	Foggy	W.	Wind strong; cold.
30	.....do	.....do	W.	
31	Fair	Fair	SW.	Cool; sand flies a torture.
Aug. 1	Cloudy	Light rain	SW.	Wind blowing fresh.
2	.....do	Cloudy	SW.	Rained a little during night.
3	.....do	.....do	SW.	Reached the Koyukuk River.
4	Clear	Clear	0	Nearly clear all day; warm and pleasant.
5	Cloudy	Cloudy	0	Vegetation becoming less rank.
6	Light rain	Heavy rain	E.	Growing colder.
7	Heavy rain	.....do	E.	Cold and disagreeable; wind light; Koyukuk River rose 4 feet in 24 hours.
8	Cloudy	Cloudy	0	Rained some during night.
9	Fair	Fair; cloudy	SW.	Rather cool; traveling nearly north; turned back at noon.

Abstract of journal—Continued.

Date.	State of weather.			Remarks.
	A. M.	P. M.	Wind.	
1885.				
Aug. 10	Cloudy	Light rain	W.	Cold; wind fresh.
11	Heavy rain	Heavy rain	W.	Heavy rain all day.
12	Fair	Cloudy	0	Cold.
13	Heavy rain	Cloudy; showery	W.	Very cold; wind strong.
14	Fair	Fair	W.	Cold; wind blowing up river strong.
15	Cloudy; fair	Cloudy	W.	Saw a star for first time this fall.
16	Light rain	do	W.	Wind light.
17	Cloudy	Light rain	0	Natives on the river preparing for winter.
18	Light rain	Cloudy	W.	Rain light; day warmest we have had for some time.
19	Fair	Fair	0	Quite warm and pleasant.
20	Cloudy	Light rain	0	
21	do	Cloudy	W.	Reached Yukon.
22	Fair	Light rain	W,	Started for coast.
23	Heavy rain	Showery	0	Begin the trail to Unalaklik.
24	Clear	Clear	0	Beautiful day; traveling on tops of mountains.
25	Fair	Cloudy	W.	Light wind; very little rain.
26	do	do	W.	P. m., late, few drops of rain.
27	Cloudy	do	SE.	Reached coast.
28	do	Light rain	SE.	Wind fresh and cold.
29	do	Cloudy	SE.	Very little rain, but very cold.
30	do	Fair	S.	Cold; arrived at Fort St. Michael.

METEOROLOGICAL SUMMARY.

TABLE I.

During the march.	Dates.		Total days.	Number of days—				Prevailing direction of wind.	Remarks.
	From—	To—		Clear.	Fair.	Cloudy.	Precipitation.		
Nuchek to Taral	Mar. 20	Apr. 8	20	0	4	16	17	{E. SE.}	Rain very heavy.
Taral up to Chettystone and return	Apr. 9	May 4	26	11	12	3	7	{E. W.}	Wind generally up and down river.
Taral to Alaskan Mountains	May 5	June 4	31	12	9	10	8	E.	Rain light.
Crossing Alaskan Mountains	June 5	June 9	5	4	1	0	0	0	
Head Tanana River to Yukon River.	June 10	June 26	17	9	4	4	5	W.	Rain heavy.
At Nuklukyet, on the Yukon River.	June 27	July 27	31	10	12	9	13	W.	Showery, with thunder.
Nuklukyet to Koyukuk River	July 28	Aug. 3	7	1	0	6	3	{W. SW.}	Dense fog.
On Koyukuk River to Yukon River.	Aug. 4	Aug. 21	18	0	5	13	6	W.	Rain generally heavy.
Nulato to Fort St. Michael	Aug. 12	Aug. 30	9	1	2	6	4	{SW. SE.}	Crossing Coast Mountains.

TABLE II.—*Condensed summary.*

Nuchek to Taral	Mar. 20	Apr. 8	20	0	4	16	17	{E. SE.}	Coast region; rain heavy.
Taral to head of Tanana River.	Apr. 9	June 9	62	27	22	13	15	{E. W.}	Copper River region; rain very light; atmosphere dry.
Head of Tanana River to Fort St. Michael.	June 10	Aug. 30	82	21	23	38	37	W.	Yukon River region; rains; mostly hazy.

TABLE III.—*Percentage of the number of days on which precipitation fell in the different regions during the expedition.*

Place.	Percentage.
Coast region	85
Copper River region	24.2
Yukon River region	45.1

TABLE IV.—*Comparative rainfall and relative humidity, 1884.* a

Place.	Total annual precipitation.	Mean annual humidity.
	Inches.	
Sitka	110.94	74.4
Unalaska	155.29	80.6
Fort St. Michael	15.50	88.4
Copper River Valley b		53.9

a From meteorological records in the office of the Chief Signal Officer, Washington, D. C.
b Mean of observations taken while the Alaskan Exploring Expedition was ascending the valley in 1885.

TABLE V.—*Observations taken at Nuklukyet.* a

Kind.	Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Maximum temperature	1882	.....	.....	.....	.....	.....	.....	.....	79	60	52	36	30
Maximum temperature	1883	22	37	46	51	72	.....	.....	.....	.....	.....	.....	.....
Minimum temperature	1882	.....	.....	.....	.....	.....	.....	.....	+30	+23	—21	—30	—52
Minimum temperature	1883	—43	—43	—37	—10	+42	.....	.....	.....	.....	.....	.....	.....

a Compiled from records in the office of the Chief Signal Officer, Washington, D. C.

The greatest degree of cold ever known in the Territory was 70° below zero of Fahrenheit; but such cold is very rare.—DALL.

At Fort Yukon I have seen the thermometer at noon, not in the direct rays of the sun, standing at 112°, and I was informed by the commander of the post that several spirit thermometers, graduated up to 120°, had burst under the scorching sun of the Arctic midsummer.—DALL.

TABLE VI.—*Mean temperatures.* a

Season.	St. Michael, lat. 63° 28′ N.	Nulato, lat. 64° 40′ N.	Fort Yukon, lat. 66° 34′ N.
Spring	+24.3	+23.9	+14.2
Summer	53	60	59.7
Autumn	26	+36	+17.4
Winter	+ 8	—14	—23.8

a Compiled from records in the office of the Chief Signal Officer, Washington, D. C.

ALASKA.–1897.

RELIEF OF THE DESTITUTE IN GOLD FIELDS.

Capt. P. H. RAY, Eighth United States Infantry.

RELIEF OF THE DESTITUTE IN GOLD FIELDS.

By Capt. P. H. RAY, Eighth United States Infantry.

INTRODUCTION.

Conflicting reports in the summer of 1897 having been received by the War Department as to the condition of affairs existing in Alaska, especially relative to actual and threatened lawlessness, the Secretary of War decided to send an officer of the Army to ascertain the real conditions and report the facts to him at the earliest possible date.

Capt. P. H. Ray, Eighth United States Infantry, with an assistant, Lieut. W. P. Richardson, was therefore directed, on August 4, 1897, by the Secretary of War, to proceed to Alaska for this purpose, with instructions to make a full and complete investigation and report the condition of affairs to him with such recommendations as he might consider to be in the interest of law and order in the Territory. He was directed to ascertain whether those people who had taken up a residence in the Territory were law abiding or otherwise; the necessity for stationing troops in the newly discovered gold fields, and if the food supply in the country was sufficient to subsist the population through the winter. He was charged to observe "carefully and accurately," not to "form hasty judgments or make hasty reports," but to keep constantly in mind the importance of the accuracy and reliability of all reports made to the Department on the conditions he found to exist. The letter of the Secretary of War to these officers of the Army concluded as follows:

> The President has sent you in confidence of your ability, and as a means of information to him. You are expected to justify this confidence.

In the early fall of 1897, and while Capt. P. H. Ray and Lieut. W. P. Richardson were in the Territory gaining information as to existing conditions, the newspapers, notably those of San Francisco, Portland, Seattle, Chicago, and New York, were directing public attention to the danger of starvation among American citizens who had gone to the newly discovered gold regions in Alaska, and chambers of commerce and like civic organizations on the Pacific coast were appealing to the Secretary of War for assistance to relieve what was believed to be great and imminent distress with which American miners in the gold fields of the northwest territory of Canada and Alaska were reported to be threatened on account of the insufficiency of food supplies.

The Senate of the United States, on December 9, 1897, took cognizance of the reported existence of the conditions herein stated by passing the following resolution:

> *Resolved*, That the Secretary of War be directed to report to the Senate such information as he has respecting the lack of sufficient food supplies among the American citizens who have gone into the mining districts of the Yukon River and its tributaries, and whether, in his judgment, there is danger of actual suffering from a want of such supplies unless relief is afforded by public or private contribution.

The response of the Secretary of War to this resolution was communicated to the Senate under date of December 13, 1897. It contained copies of dispatches and reports submitted by Captain Ray, dispatches from the Tacoma Citizens Committee, the Portland Chamber of Commerce, and information from three other independent sources, believed to be entirely reliable, including

one person who had just arrived from Dawson City, all tending to show a very serious condition of affairs in the Klondike region, and that unless supplies were introduced into that country by the 1st of March, extreme privation and probably starvation of a great many people would ensue.

The response of the Secretary of War, under date of December 13, 1897, to this resolution of the Senate concluded as follows:

> Although there are many tons of supplies at Fort St. Michael, about 1,770 miles from Dawson City down the Yukon, it will be impossible to get any food from that point before next summer.
>
> The only possible routes by which supplies can be transported into the mining district at the present season would be either by the Chilkoot or White Pass, through Lakes Linderman and Bennett, and down the Lewis and Yukon rivers over the ice, or through the Chilkat Pass and over Dalton's Trail, approximately 700 miles and 550 miles, respectively, from Juneau, requiring from thirty to thirty-five days' travel from Juneau, a most hazardous and perhaps impossible trip, although it is believed it can be accomplished. From the best information that can be obtained it is believed that the use of reindeer will be the means by which these supplies can be gotten through, if at all. It is therefore recommended that reindeer be purchased in Lapland to the number of 500 and permission granted to bring reindeer drivers from that country; this upon the information that it requires much skill to manage these animals.
>
> It is believed that supplies taken into that country need not, to any great extent, be furnished as a gratuity, but that many of the miners will be able to pay the cost of such supplies.

On April 4, 1898, 326 reindeer, together with the Lapp drivers and their families, were turned over to the Interior Department; the War Department, in accordance with the understanding with the Department of the Interior, assuming the contract made between the Lapp drivers and the War Department to furnish subsistence, clothing, and salaries up to January 31, 1899.

Dr. Sheldon Jackson, in his report of November 15, 1898, to the Secretary of War, states:

> On the 4th of April, in accordance with your instructions to the commanding general of the Department of the Columbia, Capt. B. Eldridge, United States Army, had divided the herd, reserving 200 head for the War Department and turning over 326 head to me for the Interior Department.

It was the intention of the Department to utilize 200 head of the reindeer in connection with the military expeditions in the interior of Alaska, but as no moss for their subsistence could be found nearer than 60 or 70 miles from Haines Mission upon which the reindeer could be pastured, and as the trail leading to this moss-bearing section was almost impassable by reason of a sudden change in the weather, the condition of the animals was not such as to justify using them in the service of the expeditions that season. The agreement with the Lapp drivers, showing the salaries, amounting to $13,559.70, contracted to be paid to them by the War Department from the date of their employment to January 31, 1899, is in the possession of the War Department.

The North American Transportation and Trading Company and the Alaska Commercial Company, in October, 1897, requested Capt. P. H. Ray, United States Army, to protect their warehouses, located at Circle City, and the merchandise therein from the lawless element which had organized to obtain stores and subsistence from these companies through forceful measures. On the 29th day of October, Captain Ray issued a proclamation, and in the name of the Government of the United States took possession of the warehouses of the North American Transportation and Trading Company and the Alaska Commercial Company, from which he issued supplies to destitute people in that section of Alaska. The amount paid from the appropriation of $200,000 to the Alaska Commercial Company for relief supplies issued by Captain Ray amounted to $22,329.81, and to the North American Transportation and Trading Company $9,442.78. For the supplies furnished to the destitute people and miners from the stocks of these commercial companies Captain Ray took notes from many of those who received relief, payable to the Government of the United States, and by him delivered to the War Department.

In accordance with the requirements of section 2 of the act of December 18, 1897, directing the Secretary of War to make a report in detail to Congress, at the beginning of its next regular session, as to all purchases, employments, sales, and donations or transfers under the provisions of the act for the relief of people in the mining regions of Alaska, the disbursements from the appropriation of $200,000 were made for relief subsistence supplies, means of transporta-

tion, employment of labor, and other incidental expenses in a sum aggregating $142,627.42. There was expended from this appropriation of $200,000 for subsistence stores and other miscellaneous property the sum of $25,582.68. Upon the abandonment of the relief expedition there were transferred from these stores to the Army and Laplanders, and issued to destitute people of Alaska, supples amounting to $16,452.84, exclusive of the $31,772.59 paid to the Alaska Commercial Company and the North American Transportation and Trading Company for supplies issued from their warehouses to the destitute by Captain Ray. Under the authority granted to the Secretary of War by the act, supplies to the amount of $7,493.03 were sold, which amount has been covered into the Treasury, as provided by law. The balance of these stores and property is in the possession of disbursing officers, upon which returns have not yet been made. The 537 head of reindeer were purchased and transported from Norway to Haines Mission, Alaska, for $65,893.43, or about $125 per head. The value, therefore, of the 326 head delivered by the War Department to the Department of the Interior, as provided by said act, was $40,750.

On December 9, 1897, a resolution was introduced in the United States Senate looking to the relief of people in the Alaska gold fields, and on December 16, 1897, a bill for the same purpose was introduced in the House of Representatives, which was passed and became a law December 18, 1897. The bill authorized that the sum of $200,000 be appropriated, out of any money in the Treasury not otherwise appropriated, to be expended (or so much thereof as may be necessary) in the discretion and under the direction of the Secretary of War, for the purchase of subsistence stores, supplies, and materials for the relief of people who are in the Yukon River country or other mining regions of Alaska, and to purchase transportation and provide means for the distribution of such stores and supplies. The bill further provided that the consent of the Canadian Government must first be obtained in order that the Secretary of War might cause the relief provided for to be extended into Canadian territory. The subsistence stores, supplies, and materials were to be sold in the country named, at such prices as were to be fixed by the Secretary of War, or donated where he found people in need and unable to pay for the same. The bill also authorized the Secretary of War to use the Army of the United States in carrying into effect the provisions of the act. In his discretion he was further authorized to purchase and import reindeer, and employ and bring into the country reindeer drivers, or herders, not citizens of the United States, or to provide such other means of transportation as he might deem practicable. When the Secretary of War should find no further use for the reindeer and their outfit, he was authorized under the provisions of the act to turn over the same, or any part thereof, to the Department of the Interior, and the proceeds arising from all sales of the same were to be covered into the Treasury of the United States. The last section of the act directed the Secretary of War to report in detail to Congress, at its next regular session, all matters relating to purchases, employments, sales, donations, or transfers made under the provisions of the act.

In pursuance of the authority given to the Secretary of War by this act, and by an arrangement with the Department of the Interior, Dr. Sheldon Jackson, an agent of that Department, was instructed, on December 23, 1897, to proceed to Norway and Sweden to purchase 500 domestic reindeer, with sleds, harness, and drivers, and transport the same to the United States. Lieut. D. B. Devore, U. S. A., accompanied Dr. Jackson as disbursing agent of the expedition. The manner in which their mission was fulfilled is set forth at length in reports made by Dr. Jackson to the Secretary of War.

The expedition landed in New York on the steamer *Manitoban* February 27, 1898, with 113 immigrants, 538 head of reindeer, 418 sleds, 411 sets of harness, and a large quantity of reindeer moss for forage. After due advertisement a contract was made with the Pennsylvania Railroad Company to transport the expedition to Seattle, Wash., for $10,418.75. The reindeer train arrived at its destination, Seattle, on March 7, 1898, without accident or loss and with the animals in excellent condition, the run across the continent having been made on time scheduled for passenger-train service.

Early in January reports began to reach the Department, through the commanding general, Department of Columbia, and Maj. L. H. Rucker, U. S. A., stationed at Dyea, Alaska, in charge

of the Alaska relief expedition, to the effect that the accounts of destitution and threatened starvation in the Klondike country had been greatly exaggerated. These reports emanated from returning miners, and were carefully verified by the officers mentioned. Accordingly, it was decided, early in March, to abandon the relief expedition, as it had become apparent that, by reason of the exodus of starving miners from Dawson to Skagway and Dyea and down the Yukon River in search of relief from subsistence stores which were on icebound steamers ascending the Yukon, that further relief was not needed.

It was now determined by the Secretary of War to equip three military exploring expeditions to penetrate the interior of Alaska, with instructions to make reconnoissances and ascertain practicable routes of travel to the gold fields of Alaska and the Northwest Territory through possessions of the United States, and to furnish relief to inhabitants and miners who were found in want and destitution. Expedition No. 1 was ordered to proceed from Skagway and Dyea along the Dalton trail to Dawson City, Northwest Territory, thence to Belle Isle. Expedition No. 2 was ordered to explore the valley of the Copper River and tributaries, from its mouth to Tanana River. Expedition No. 3 was ordered to start from Cook Inlet and endeavor to discover the most direct and practicable route from tide water to the crossing of the trail between Copper River and Forty Mile Creek, on the Tanana. The three expeditions were to communicate with each other if practicable.

On March 10, 1898, the Secretary of the Interior transmitted to the Secretary of War a communication in which he stated that he had directed Dr. Sheldon Jackson to proceed at once to Dyea to confer with Captain Ray in regard to the best method of driving 337 head of reindeer to be sent by Lynn Canal across the Dalton trail to the neighborhood of Circle City. Dr. Jackson was instructed by the Secretary of the Interior to confer with Captain Ray with regard to the safe-keeping of the animals, as well as securing for them a suitable pasturage at Circle City until the following May, when, in accordance with an understanding with the Secretary of War, they were to be turned over to Dr. Jackson as the agent of the Department of the Interior. It was understood, on the part of the Secretary of the Interior, that the War Department was to be in charge of and responsible for all the animals until they were delivered to Dr. Jackson in May. Fifty of the 337 reindeer were to be ultimately turned over to the Department's representative until the middle of April, 1898. The last-named number of animals were intended for the Geological Survey on its trip over the Dalton trail to a point near Circle City in Alaska. By an understanding with the War Department, subsistence was to be furnished by that Department for the reindeer attendants for at least one year. It was further understood that the traveling expenses and subsistence of Dr. Jackson while engaged on this duty were to be paid out of the relief fund. Dr. Jackson was subsequently detailed for the duty above named, with definite instructions as to the duties he was to perform.

Subsequently the Secretary of the Interior reached a conclusion that it would be better, after the expedition with the reindeer had reached Pyramid Harbor, or Haines Mission, Lynn Canal, Alaska, that the 337 reindeer intended for the Department of the Interior should be turned over at the point named for Dr. Jackson, who would thereafter be responsible for them.

On March 16, 1898, the Assistant Secretary of War, Hon. G. D. Meiklejohn, in a letter to the Secretary of the Interior, informed the latter that there was no authority for the War Department to pay the traveling expenses and subsistence of Dr. Jackson from the fund heretofore named, after the reindeer should have been delivered to Dr. Jackson at Pyramid Harbor, or Haines Mission, Lynn Canal, Alaska, as his connection with the War Department would then terminate and he (Jackson) would then become the agent of the Department of the Interior. The Assistant Secretary of War, however, stated in this connection that Dr. Jackson would be authorized, should he so desire, to purchase army subsistence under the conditions usually granted agents of other departments in cases in which the purchase of army subsistence was desirable. By reason of the correspondence that had taken place between the Secretary of War and the Secretary of the Interior, and in pursuance of the law authorizing the Secretary of War to turn over the reindeer, or any number thereof, to the Department of the Interior, the Secretary of War, through the Adjutant-General of the Army, telegraphed the commanding

general of the Department of Columbia the agreement finally reached between the Secretary of War and the Secretary of the Interior relative to the reindeer.

After the abandonment of the relief expedition, and while in Seattle, four of the reindeer died from the diet of alfalfa grass upon which it was necessary to subsist them by reason of the exhaustion of the supply of reindeer moss shipped from Norway, and from Seattle to Haines Mission, Alaska, eight more died from the effects of this forage. The reindeer were shipped on the steamship *Seminole*, from Seattle, on March 16, 1898, and arrived at Haines Mission, Alaska, on the 29th day of March, under the supervision of Dr. Sheldon Jackson of the Bureau of Education of the Interior Department.

Captain Ray's mission into Alaska covers a wide field of human endeavor. His report is somewhat voluminous, consisting of letters from the several points which he visited in Alaska, as well as his observations upon what he witnessed, all of which have been made fully known to the War Department. What he saw and what he had the honor to do, is best expressed in his communication dated Washington, May 5, 1898, and addressed to the Adjutant-General of the United States Army. This report, for the convenience of reading, has been printed in the form of a narrative.

NARRATIVE.

Owing to the rapidly changing condition of affairs along the Yukon River, the absence of all means of communication with the United States, and the fact that from the 1st of April to the 1st of July it would be utterly impossible for me to either get out or have any communication with the Department, I deemed it my duty to make the attempt to get out of the country by traveling up the Yukon over the ice by dogs, by Chilkoot to Seattle.

I left Fort Yukon February 23, 1898, with a team of dogs, leaving Lieutenant Richardson in charge, with orders to be governed by the instructions to me, and with the breaking up of the ice to proceed down the river to St. Michael and there await further orders from your office. I reached Circle City on the 26th and, after resting my dogs and having my sleds repaired, left there on March 1, reached Forty Mile March 11, and Dawson, Northwest Territory, March 14. I remained there three days, visiting the mines on Eldorado and Bonanza creeks, gathering information relative to the condition of affairs in Northwest Territory, where citizens of the United States were interested.

I left Dawson on March 18 and passed over Chilkoot Pass on April 7, reaching Dyea the next day, making a journey of over 1,000 miles by my log, and an average of over 26 miles per day for the actual travel. I sailed from Skagway on the 11th and reported here on the 22d of April. The journey from Fort Yukon was without any special incident, except the inconvenience and discomfort from three severe snowstorms and some delay caused by meeting with open water at White Horse Rapids and Thirty-Mile River.

To those who may be required to make the journey I suggest that the start from Dawson should not be made later than March 10.

Much of the success of my journey I owe to the courtesy and assistance extended to me by the Canadian northwest mounted police. Major Walsh and Captain Constantine granted me free use of their stations and supplies throughout the whole route, which enabled me to travel with great rapidity, and it was only necessary to haul supplies between their stations.

FOOD SUPPLY.

From Circle City out I did not find any scarcity of food. On the contrary, there is plenty at Dawson and Fort Yukon for all the people now there, and those now on the trail are each required by the Canadian government to take with them 1,000 pounds of the essentials.

It is conceded by all who have been in the country for several years that food has never before been so plentiful at this season of the year.

I found flour selling in the gulches in the Klondike at $30 per sack of 50 pounds and salt meats at 75 cents per pound, when in January the prices were $150 per sack and $1.50 per pound.

This is owing to the fact that last fall private parties bought and hoarded supplies, hoping to get starvation prices in the spring, and now, while the stores at Dawson are without food, the crisis is past and there is no extraordinary demand, and all are anxious to unload.

With the large food supplies being carried in by people entering the country via Chilcoot, I am of the opinion that the reliable companies operating the river lines of boats will be able to place along the river an abundant supply of food for all who can possibly get into the country this year; but the ability of a large per cent of them to pay for it is very much in doubt.

MILITARY POSTS.

Since my last report on this subject I have become convinced that the conditions have materially changed, and the great influx I witnessed at Chilcoot and along the lakes will necessitate a much larger force than I then contemplated. I now suggest that not less than two companies be placed at the mouth of the Tanana, one at the mouth of Mission Creek, and one at St. Michael.

There is an abundance of timber to construct the posts at Tanana and Mission Creek, and for the post at St. Michael, but I suggest that the buildings be constructed of stone. Just east of the church is a high rocky bench where a rock foundation can be obtained and a great abundance of excellent rock (lava) for building purposes. The climate at St. Michael is very severe and damp. The most of the island is very wet and boggy, covered with a heavy growth of sphagnum. Frame buildings are very cold and perishable in this climate. By constructing the buildings of lava rock, two stories above a basement, they will be dry, comfortable, and very durable, and can be economically heated. It will be necessary to ship only lime and cement and the necessary flooring and finishing lumber. In the event a battalion can not be spared for this service, I respectfully suggest that a post at Mission Creek be established and two companies placed there. With a strong garrison at this point and a detachment at St. Michael guarding the only two points of exit and entrance to the country, the moral effect upon the lawless element will tend to discourage crime.

I deem it of the greatest importance that the points on the Yukon I have recommended should be occupied with the opening of navigation, for with the people now in Dawson and along the Yukon River in Alaska between the boundary and St. Michael, augmented by the people I have seen going into the country by Chilcoot, the opening of navigation will find nearly 18,000 people in that country, which on our side of the boundary is without any semblance of law, civil or military. Under existing conditions I can not see how the civil authorities can possibly give any protection to life and property, and my experience has been such that even if they had all the personnel on the ground they would be powerless to deal with the questions that will confront them the coming summer.

POPULATION AND SETTLEMENTS.

I find that the population is rapidly shifting from the Northwest Territory to Alaska. While on my journey out, between the boundary and Dawson I met fully 300 people going down the river, and the general answers to my questions were, they were going to Alaska to stay.

This migration is attributable to two causes; first, dissatisfaction with the Canadian mining laws, especially the royalty on the output; and the fact that the whole country in the Klondike district has been staked and there has not been any new rich discovery made in the Northwest Territory since the Klondike strike, so that many good-paying districts in Alaska that were abandoned when the Klondike rush occurred are now being relocated. The most noted are Birch Creek, Seventy Mile, American Creek, and Mission Creek. As I came up the river I found many people gathered at the mouth of Mission Creek and Seventy Mile. Towns are being built at both places. The former is called Eagle City and the latter Star City.

The principal points in Alaska where people are now congregated in any number are as follows:

On Forty-Mile River, west of the boundary, about 140.
Mission Creek (Eagle City), about 200.
Seventy Mile (Star City), about 250.
Charley River, about 180.
Coal Creek, about 75.
Circle City, about 250.
Fort Yukon and vicinity, about 350.
Rampart City (Manook), about 500.
Tanana (Seward), about 250.
Wintering between Tanana and St. Michael, about 200.
St. Michael, about 250.

ROADS.

I deem it of the greatest importance for the development of the country that roads should be opened, so as to enable the people to enter the country not only from the Yukon to the open sea in our own country, which is of the greatest importance, but to enable miners and prospectors to get into the interior with their supplies. Under existing conditions persons can enter the country only by the one great highway—the Yukon River—and they can not hope to be landed at any point in Alaska earlier than July 1.

The gold-bearing districts are from 50 to 150 miles back from the main stream. There are not any summer trails except foot trails, and provisions and mining tools can only be transported on the backs of men. But few entering the country for the first time have sufficient means for packing, consequently it is impossible for them to get to a point where they stand a chance of finding a claim that will pay before the frost closes the streams, so as to make travel by sled over the ice along the smaller streams possible. A person entering the country for the first time should have provisions or money enough to last for two years.

All of the interior back from the Yukon is still practically unexplored, geographically or geologically. With the opening of roads through the forest, so that horses, mules, and cattle may be used, will come cheap transportation, and large mining districts will be opened up that can not now be worked at a profit owing to the high price of food. I recommend that an appropriation of $100,000 be asked for to be expended under direction of the commanding officer of the district in first opening a road from Seward to the head of Prince William Sound or Cook Inlet, the next a road to be opened north from Seward to the Koyukuk.

MINING AND OTHER INDUSTRIES.

I do not find anything either in Alaska or Northwest Territory to justify the great rush of people to that country, or the enormous investments now being made in transportation, trading, and mining companies. In the Northwest Territory no discoveries of extraordinary richness have been made since that of the Klondike, and the paying claims are almost entirely confined to Bonanza, Eldorado, Dominica, Honka, and Sulphur, with a few claims on Bear Creek. In this district all rich claims are well known and held at very high prices, and while the whole country has been staked it has been done for speculative purposes, and no work is being done except such as is necessary to hold a title until they can be sold to the unwary newcomer or disposed of in the States for corporation schemes. Captain Constantine, of the Canadian Northwestern mounted police, is my authority for denouncing the movement as a fraud.

In Alaska there are only three districts that were being worked at the time I left. They are Manook Creek, Birch Creek, and Forty Mile; but very few claims were being worked in each. It is well known that there are extensive districts along the Tanana, Koyukuk, Porcupine, and Juan de Leur that will pay from $12 to $20 per day per man, but none are being worked, as such claims can not be made to pay with the present price of food.

In the absence of any other industry, except cutting wood for the river boats, I do not see anything in the future for over 90 per cent of the people now flocking to that country, but disappointment and suffering. Even those who obtain employment at $1.50 per hour find that after deducting the cost of food packing, candles, etc., they do not net to exceed $2 per day, and they tell me it is barely enough to tide them over the idle season.

Up to date no paying mineral lodes of either gold or silver have been discovered in north Alaska, so far as known.

FUTURE DEVELOPMENT.

I am fully satisfied that in the near future Alaska will be the source of great wealth, but the development will necessarily be slow owing to the climatic conditions. I recommend the early introduction of horses, mules, and cattle, and extra inducements should be held out for the development of agriculture in the valley of the Lower Yukon especially. Wild hay can be obtained there in great abundance, and oats, barley, and spring wheat can be successfully cultivated, as well as potatoes, turnips, and all the more hardy garden vegetables, all of which would be required for many years to meet the local demand, and by reducing the cost of transportation and food render it possible to profitably work a large per cent of the mines now lying idle.

As an instance bearing on this subject: There was a yoke of cattle landed at Fort Yukon last fall by the N. W. T. and T. Company. In November the last of the forage was exhausted, and thereafter they were subsisted on grass gathered by Indian children from under 3 feet of snow. They were worked all winter hauling wood and logs, and were in good condition when I left.

But few of the people now entering the northern part of the Territory will ever become a factor in its permanent development. They must pass away before the time when the wealth of the country will become known and developed. To promote this I recommend that several well-equipped parties be put in the field and a thorough geographical and geological exploration of the country be made, so that men of ordinary means will be able to engage in the work of prospecting and mining. At present it requires considerable capital to first explore the country for a practicable route to transport supplies before any work can be done in prospecting.

FINANCE.

The ruling rate of interest at Dawson is from 10 to 12 per cent per month, which is the best exemplification I can give of the speculative condition of the finances of that country.

REPORT OF AN EXPEDITION INTO ALASKA.

By W. P. RICHARDSON, First Lieutenant, Eighth Infantry, U. S. A.

My report covers the period from the departure of Capt. P. H. Ray, Eighth Infantry, from Fort Yukon on February 23, to July 7, 1898.

I remained at Fort Yukon until the arrival on June 5 of the river steamer *Portus B. Weare*, of the North American Transportation and Trading Company.

No new issues of importance arose in connection with the business of providing for the destitute people who had wintered there and in the vicinity. A small supply of provisions left in my charge for certain sick and destitute Indians was distributed; also, such of my own stores as could be spared. These proved sufficient, in my best judgment, for all cases of actual want, and I was not called upon to place the Government under any additional obligation to relieve distress.

The various wood parties in the vicinity quit cutting in the latter part of March and early April and came into Fort Yukon to await the opening of the river. Between six and seven thousand cords were put up for the two companies within 30 miles of the place.

About 50 men were prospecting from Fort Yukon on both sides of the river. Of these, 21 were of one party which went to the head of the Gens de Large, a stream emptying into the Yukon from the north about 35 miles below Fort Yukon. From there they crossed over to the head waters of the Koyukuk. Eighteen went up the Porcupine and Salmon rivers, and 12 went to the southward in the Beaver River country. No discoveries of importance were reported from any of the parties. A portion of the Beaver River party expected to remain out until the fall.

Three deaths occurred during the winter among the white men at Fort Yukon, all due primarily to exposure. A building called the hospital was provided for the sick and for those

too old to work. Of this latter class there were 15, ranging from 55 to 70 years of age. Much sickness prevailed among the Indians, principally of a pulmonary character. From the missionary's report I find that 19 died since the 1st of last August.

The following average temperatures were taken during the winter and spring:

For the month of—
November, 1897, 18° F., taken 8 a. m.
December, 1897, 8° F., taken 8 a. m.
January, 1898, 24° F., taken 8 a. m.
February, 1898, 29° F., taken 8 a. m.

For the month of—
March, 1898, above 6° F., taken 8 a. m.
April, 1898, above 36° F., taken 12 m.
May, 1898, above 49° F., taken 12 m.

The coldest single day was January 16, when the thermometer registered minus 62 degrees. The coldest period of seven days was from February 16 to 22 inclusive, when the thermometer showed an average of 50¼ degrees below. No severe weather was experienced after the end of February.

On the 6th day of May the water in the river began to rise, lifting the main body of the ice. This continued, increasing in degree, till the early morning of the 13th, at which time the water had risen 14 feet, opening the ice in many places and flowing over it. At 3.30 a. m. the 13th, the whole body of ice moved down the river, accompanied by an additional rise of 4 feet of water, which cast huge cakes of ice far up on the shore. This is said to be the earliest opening of the river in many years. I learned later that it opened at Dawson on the 8th, and at Circle City on the 12th. The rate of movement appears to be about 100 miles per day. Ice and driftwood continued to run in the river till May 20, when it became practically clear and safe for navigation. I learned on the 21st that the four boats, *Portus B. Weare*, *Bella*, *St. Michael* and *Victoria*, wintering at Circle City, had been forced far up on the bank of the slough by the rise in the river, and there left aground by the receding water and cut off from the main river by a huge jam of ice at the mouth of the slough. These boats, excepting the *Victoria*, did not get into the river until the 4th of June. One barge wintered at Fort Yukon, and was saved without difficulty and at small expense.

The main channel of the Porcupine enters the Yukon about 10 miles below Fort Yukon. The ice of this stream went out on the 18th, and the high water, overflowing its banks, poured into the Yukon across the flats for several miles above and below its mouth. The water of this river and of the Yukon continued to rise steadily until the 1st of June, at which time all the vicinity of Fort Yukon was submerged save a few high places. Among the points not covered was that reserved by Captain Ray for a military post. The natives about Fort Yukon informed me that the water had never been known to rise so high before. After leaving Fort Yukon I observed in a number of instances that cord wood, which had been piled in presumably safe places, had been scattered and partially floated away by the high water.

Within twenty-four hours after the water had reached its highest point it began to fall again, which it continued to do rapidly, owing to the disappearance of the snow on the hills and mountain sides, and the absence of any rainfall. By the 25th of June the water was close to the extreme low-water mark of the autumn season before freezing up, and boats were already having trouble getting over the bars in the river. This illustrates how very brief is the period of high water in the spring when navigation is safe for boats of any considerable size or draft over this part of the river. This year that short period was almost entirely lost through various accidents to the boats wintering along the river.

I am of the opinion that Fort Yukon will of necessity become a permanent transshipping point for the river business, where a large quantity of supplies may be stored before the closing of the river in the fall, and advantage taken of the high water in the spring to push them through the upper river. No trouble is had with ordinary river boats up to that point—due, no doubt, to the increased volume of water below the mouth of the Porcupine. I think it is safe to predict that many of the new boats advertised to ply upon the river this season will never get above Fort Yukon, and a large number of disappointed people may be forced to spend the coming winter in that vicinity.

Mail by small boat from Circle City reached me on the 26th of May, but nothing of an official

nature, and nothing later than February 1. This and one of January 1 were the only mails received after the closing of the river last October.

The steamer *Portus B. Weare* arrived, as noted elsewhere, on June 5. The *Bella*, of the Alaska Commercial Company, arrived the next day. These boats carried such supplies as remained in the two company storehouses up the river.

I took passage on the *Portus B. Weare* June 6, discharging the employee retained up to that date. The trip from Fort Yukon to Dawson occupied six days, without incident worthy of note. The steamer remained at Dawson thirteen days, and then proceeded down the river to St. Michael, where she arrived July 5, and from which point this report was sent.

I give briefly some facts about Dawson and vicinity which may be of interest to the Department, and upon points within our own territory, which, it is thought, will give a fair idea of the situation up to date and the outlook for the near future.

The output of gold from the Dawson district for the past winter's work will not exceed $10,000,000—more conservatively estimated at from $7,500,000 to $8,000,000. I should judge the population of Dawson to be, at the time I left, from 12,000 to 15,000, by far the larger part of whom are still living in tents. Small boats arrive continually from the upper river, averaging during one twenty-four hours, in which they were counted, one for every eight minutes.

Most of the small boats coming down bring a surplus of provisions, including fresh vegetables, eggs, and fruit, and it is to these small but numerous additions to the supply of the commercial companies that the people owe their comfort at the present time. A few of the prevailing prices at Dawson, which obtain with slight modification at Circle and other points, are $2.50 for the plainest meal (ham and eggs, bread, butter, and coffee). Beefsteak costs extra; this is sold to the restaurants at $2 per pound. A stew of fresh oysters, $3. A restaurant wine card gives: Champagne, $40 per quart; $20 per pint; ale, $5 per bottle. A pair of horses, wagon and driver earn $10 per hour; a good cook, $15 per day; ordinary labor, $1.50 per hour. These prices impressed me as out of all proportion to the output of money from the country, the present abundance of supplies there, and the limited field of labor.

Only a small proportion of the people now there can find steady employment, and that phase of the situation is growing daily worse. The streets are thronged with a crowd of idle men. Many belong to the class who are not looking for work, and these, many of whom will doubtless float down into our territory, will become a troublesome and dangerous element as the winter approaches, unless controlled. It must be said to the credit of the Canadian mounted police that Dawson has been, and is to-day, with all its motley population and vicious elements, a most orderly and law-abiding town. Contrary to report, I found very little sickness there.

Interest is being renewed in the district of the Forty Mile River, and many prospectors are going up that stream. Some of the best-paying tributaries of Forty Mile, notably Chicken and Miller creeks, lie within American territory. As nearly as I could learn, the output of gold from this district will be about $200,000 but few men having worked there during the last year's excitement at Dawson.

Twenty-three miles below the mouth of Forty Mile the international boundary crosses the Yukon, and 12 miles below the line is the mouth of Mission Creek, where Captain Ray located a small reservation last winter. A town site had been laid off, called Eagle City, and a mild boom was in progress, based principally on some fine prospects found on American Creek, a tributary of Mission, and aided, no doubt, by the prospect of a Government establishment, giving some permanence and a certainty of supply. It is claimed that Seventy Mile Creek, which empties into the Yukon 25 miles below Mission, can be reached 80 miles up from its mouth by a trail 20 miles across the divide from Eagle City, and that the richest tributaries of Forty Mile are accessible from the same point by an easy trail, all within American territory. Should this latter claim prove true, that trail would appear to form a part of the most feasible route through our territory from the upper river to the open sea.

A location for a town to be called "Star City" has also been made at the mouth of Seventy Mile, but nothing has been done there. This creek has been worked intermittently for several years, but the difficulty of getting food has prevented its development.

But few claims were worked in Birch Creek district (Circle City), owing to the scarcity of provisions. The season's output, however, will be in the neighborhood of $300,000. A few claims on Eagle and Mastodon creeks are declared, by men who know, to be as rich as any in the Klondike district, and produce a much higher grade of gold.

The Manook Creek district (Rampart City) is still somewhat uncertain, except Little Manook Creek. The claims here from three below to eleven above Discovery are undoubtedly good. Thirty-five thousand dollars was taken from one of them, only a small portion being worked. Recently some good bench diggings have been located, also quartz which may prove valuable.

At the mouth of the Koyukuk I met a number of men who had been prospecting up that river during the winter and spring. They report "colors" on nearly all bars and small tributaries prospected. Davis, Chapman, and Malimute creeks are mentioned as the most promising.

This report is finished after arrival at St. Michael, but without any information as to the Department's intention in respect to the upper river. I trust I am justified, therefore, in expressing my sincere belief that a very grave condition of affairs is likely to exist in that region during the coming winter, unless some means are provided very soon for the execution of the law and for the protection of life and property. None exist now between this point and the boundary. I think I am safe in predicting that several thousand people will spend the winter in our territory. Rampart City, Fort Yukon, and Circle City are the only places above St. Michael at present of sufficient permanence or business importance to justify the presence of a military force. Quarters for small detachments could be hired or purchased at these places.

ALASKA.—1897.

UP AND DOWN THE YUKON.

E. HAZARD WELLS.

UP AND DOWN THE YUKON.

By E. HAZARD WELLS.

I will begin my story by saying by way of introduction that in December, 1897, Captain Ray was isolated at Fort Yukon, Yukon Valley, Alaska. He had with him but one officer, Lieutenant Richardson, and no soldiers at his command. He was in a critical position owing to the turbulent acts of a mob which he was endeavoring to control. In this condition of things he took the opportunity of sending special dispatches from Fort Yukon to Dawson by a Mr. Gasch, who was connected with the North American Trading and Transportation Company. Captain Ray was apparently in the dark, as the mail facilities from Dawson to the United States at that time were not perfect. It was because of this condition of things that he gave the dispatches to Mr. Gasch to hand to one Captain John J. Healey, who was the general manager of the transportation company hitherto referred to. This gentleman resided at Dawson, and was instructed to see that the dispatches named were promptly forwarded to Washington. Mr. Gasch arrived in Dawson about December 15, after most of the winter travelers to the coast had departed. Accompanying Captain Ray's dispatches to the Department was an open letter to Captain Healey, which described the serious state of affairs at Fort Yukon and indicated further trouble. From this letter Captain Healey learned for the first time that there was only 300 tons of provisions at Fort Yukon, belonging to the two trading companies, instead of 1,000 tons as he had supposed. The fact was also stated that 800 people were in sight when the dispatches were written.

Captain Healey was very much disturbed over the contents of Captain Ray's open letter. It was known that large numbers of men had proceeded on down the Yukon in skiffs late in the fall, and it appeared quite likely that many of them had arrived at Fort Yukon after Captain Ray's dispatches were written. It seemed that there was a strong probability of very serious complications arising at Fort Yukon, concerning which the Government should have information as early as possible. There was no mail service out of Dawson, and the whereabouts of the United States mail carrier from Circle City to Juneau were unknown. It was generally reported that he had thrown up his contract.

Captain Healey, appreciating the responsibility placed upon him, after some deliberation made a proposition to me. I was, at the date above mentioned, a prospector, miner, and a cor respondent of a newspaper syndicate. The proposition was to the effect that the North American Transportation and Trading Company would advance $1,000 in the name of the Government to pay my expenses in carrying out the dispatches of Captain Ray, and that the Government would settle with me for my services in undertaking this mission. Captain Healey further stated that he was strongly opposed to placing the dispatches in the hands of any man leaving Dawson who was unaccustomed to winter traveling, fearing that some mishap might occur which would prevent the papers from reaching their destination. There was a general belief in Dawson, which was shared by Captain Healey, that the winter trail out to Juneau would be extremely difficult to traverse, and that numbers of men would die of starvation along the route when their insufficient supplies of provisions gave out. More or less trouble was, therefore, anticipated for travelers who were not well provided with food. It was not known that the Canadian mounted police were providing food for their needs at various points along the route. Captain Healey was very

anxious to have the dispatches placed in as safe hands as possible, and he stipulated with me that, in case I accepted the mission, I should be extremely careful in the selection of the men who were to accompany me.

I accepted Captain Healey's proposition, and, after consuming three days in getting my affairs into shape, selected John Bigelow and Charles Christianson to accompany me on the trip. Each assistant furnished two dogs. Another man, Charles Lake, also undertook to accompany the party, paying all his own bills and expenses.

On the 20th day of December I left Dawson, accompanied by the men whom I have already mentioned. We had six dogs, provisions, etc., the latter being transported upon two 8-foot sleds, three dogs harnessed to each sled. The winter trail was good almost to Pelly River, which we reached on December 29, the thermometer that evening standing at 40° below zero. During the night there was a rise in temperature of a most phenomenal character, the mercury jumping to 30° above zero by morning—a change of 70°. The rise in temperature was accompanied by a violent windstorm, which completely destroyed the trail on the river. As no parties of travelers had preceded us for some days, the unpleasant duty devolved upon us of breaking a new trail, which was difficult, owing to the crusty condition of the snow, which would not sustain our weight or that of the sleds. In most places the snow averaged about a foot or 15 inches in depth; also drifts were frequent and the ice was very rough. Coming from Dawson to Pelly River we had averaged nearly 20 miles per day, but with a bad trail, or no trail at all, we were now compelled to force our way at a slower speed, the traveling became very difficult, and as we approached the coast frequent winds destroyed the tracks made by preceding dog teams. It was necessary to walk the entire distance from Dawson to the seacoast, which, following the winding of the trail, can not be less than 650 or 700 miles. The bodily exertion caused by breaking trail and also tramping through heavy snow were necessarily severe. We walked from early morning until late in the evening for thirty-four days, allowing only one day for rest, reaching the seacoast over the Skaguay or White Pass on the evening of January 24. The trip across the summit was made through a storm of snow and sleet. On the morning of January 25 I sailed from Skaguay for Seattle on the steamship *Rosalie*. The other men remained at Skaguay for the time being. They knew nothing of the character of my mission while coming out, or that I carried any dispatches.

Arriving at Seattle on the evening of January 30, I telegraphed at once to the War Department, announcing my arrival and received telegraphic instructions from the Acting Secretary of War, directing me to turn the dispatches over to General Merriam, commanding the Department of Columbia. These instructions were carried out when I delivered the dispatches on the following day to General Merriam at Vancouver Barracks. The trip had been a very arduous one, and I had sacrificed considerable money to make it, as already stated. It seemed to me, therefore, that the amount asked for, viz, $1,500, was by no means excessive. Had I made the trip for any private business purpose, in the interest of other individuals, my bill would probably have been somewhat larger. Few men left Dawson this winter who did not expect to make $2,000 or $3,000 as a compensation for the trip. Owners of dog teams leaving Dawson during the early part of the winter, and taking with them four or five men as passengers, in many instances charged each man $800 or $1,000, therefore making a net profit from the trip of not less than $3,000. Only a few weeks before Captain Ray's dispatches arrived at Dawson City, Captain Healy had paid an outgoing traveler, who had mining claims to sell in the States, $500 to carry a business letter to Chicago. I have been particular in mentioning these instances so that the situation might be clearly understood.

General Merriam approved both of the bills presented by the transportation company mentioned and myself, and ordered vouchers issued by Quartermaster Jacobs for the payment of the same. I received my personal voucher for $1,500, and cashed it at the First National Bank in Seattle, receiving a draft on New York payable to myself. The next morning General Merriam stated to me that some doubt had arisen in his mind as to his authority to pay the bills without first submitting them to the War Department, and asked me to return the voucher pending action by the Department. As I had already cashed the voucher, I handed him the

draft which I had received, indorsing it over to Paymaster Jacobs. The voucher for $1,000, intended for the transportation company, had been all of the time in the hands of Paymaster Jacobs, he having received from me a receipt for both vouchers, amounting to $2,500. The quartermaster handed me a paper addressed to P. B. Weare & Co., Chicago, notifying them that he held a $1,000 draft subject to their orders. This paper is now in the possession of Mr. P. B. Weare.

The expenses which I incurred in making the trip out of Dawson to Seattle amounted to something over $1,300, and from Seattle to Washington, including hotel bills, $120 more, the extra $420 having been paid by me out of my personal funds. It has been my intention to ask the North American Transportation and Trading Company to settle the extra account, inasmuch as I brought them some letters from Captain Healey. I did not bring out any mining claims for sale, nor do I expect to receive money from any source except from the Government and the Weare people, as already stated, in payment for the trip.

During the summer of 1889 I first entered Alaska as the representative of a league of news papers, and made a journey from Dyea down the Yukon to St. Michael. A few gold miners were at work at that time upon the Forty-Mile Creek. In the spring of 1890 I again entered Alaska, this time by way of Chilkat Pass, having made a joint arrangement with a popular illustrated weekly and the United States Coast and Geodetic Survey Office to write descriptive articles and do some geographical work. The Coast Survey furnished scientific instruments, and also free transportation on the United States vessel *Patterson* sailing from San Francisco. While on this expedition, accompanied by four other men, including Jack Dalton, I first gained an insight into the possibilities for building a road over what subsequently became the Dalton trail. No white man had ever before crossed by way of Chilkat Pass. We followed the Indian trail to the head waters of the Talkeetna, discovering and mapping Lakes Maude and Arkell, and later on mapping the Talkeetna River down to its junction with the Yukon. Subsequently, with three men, including an Indian, I ascended Forty-Mile Creek from the Yukon, and then striking out overland with packs across the Tanana River, proceeded about 120 miles toward the head waters of the Copper and Sushitna rivers, mapping Forty-Mile Creek, Lake Mansfield, Razorback Divide, the Tok River, and other points on the way. Lack of food then compelled a return to the Tanana, which I descended for some 600 miles to its junction with the Yukon.

In 1897 I again entered the Yukon country for the third time, choosing the Skaguay or White Pass, and reached Dawson on September 20. As a result of observations made on these various trips, I respectfully submit the following statement bearing upon past, present, and future conditions in the mining regions of Alaska and of the Northwest Territory: There are undoubtedly large deposits of gold in Alaska, rivaling those of the British Northwest Territory. I noticed excellent mineral indications upon the Tanana River and in other localities in 1890. I discovered a true fissure vein of quartz 8 feet in diameter, with well-defined casing rocks, upon the Upper Tanana. This quartz evidently contained metal, specimens of which I secured to take out to San Francisco for assay, but which were subsequently lost in a river catastrophe. Numerous creeks entering the Upper Tanana bear colors of gold in the sands. All of the gold-bearing streams of Alaska so far discovered, viz, Birch Creek, Miller Creek, Forty-Mile Creek, Sixty Mile Creek, and Seventy-Mile Creek, head in the vicinity of the Tanana River and flow away to the northeast. On the southwestern slope and heading near the Tanana are the noted Copper and Sushitna rivers, the latter being the gold-bearing stream which has recently come into promi nence through the placer discoveries on Cook Inlet. The Copper River is popularly supposed to be located in the heart of a mineral belt. It is a reasonable deduction that if all of the streams flowing away from the Upper Tanana on the northeast and the southwest bear gold, that the Tanana itself must cut through a gold-bearing country. This opinion is shared by nearly all of the old-time miners now located at Dawson. Recently excellent prospects were discovered upon American creek, a tributary of the Yukon in Alaska, just below Forty-Mile Creek. The Forty-Mile diggings have been well worked out, but Miller Creek, Birch Creek, and other streams within the boundaries of Alaska in the Yukon Valley still offer inducements to placer miners.

I do not believe that any better mining region will be discovered in Alaska than will be found in the great Tanana Valley. To the westward of the Tanana rise gigantic chains of mountains, which will make prospecting toward the Kuskokwim and Sushitna rivers extremely difficult. From a good point of vantage upon a high mountain near the head of the Copper River I obtained a bird's-eye view of the country to the westward, and beheld the titanic masses of rock upheaved in much the same fashion as the Andes in South America. A range of very tall mountains parallels the Tanana on its westward side, joining at an acute angle with the high Alaskan range, which sweeps across from the Tanana near Robertson River to the mouth of the Sushitna and beyond. To the westward of this V-shaped arrangement of the mountain chain lies the vast unexplored territory of the Kuskokwim. I have ascended the Kuskokwim 800 miles from the seacoast, and found it a broad, deep, and somewhat sluggish stream, flowing in from the unknown East. Indian reports state that the Kuskokwim heads up within a three-days' overland march of the lower Tanana. A pass is reported to exist by which it can be reached from the lower Tanana. My observations on the lower Kuskokwim do not induce the belief that it came out from a gold-bearing region, but it is possible, nevertheless, as its sluggish current would hardly carry colors very far downstream.

Considerable quantities of white moss and lichens are to be found along the Dalton trail entering the country by way of Chilkat River. It is my opinion that reindeer can be taken over the Dalton trail with supplies of food for the miners and that the animals will find sufficient food along the route to keep them in good condition. Considerable quantities of willow grow along the creek bottoms and lowlands bordering upon the Yukon. The young willow shoots form a favorite food for the moose which inhabit that region, and it is quite probable that the reindeer would find subsistence upon such food, even were there no lichens and other mosses in the country. I believe that the reindeer can be advantageously used, especially as the snow is not deep, seldom being more than 18 inches in any part of the interior away from the coast. The deer can no doubt dig down through such a shallow covering and find food, as they are obliged to do in their native country. There are considerable areas of grass lands along the Yukon, following the Dalton trail, and also farther down, at Pelly River and Stewart River. Grass flats of considerable size are to be found along the Tanana and Upper Forty-Mile Creek. This grass has successfully been used in Dawson and at other points within the past twelve months as forage for horses, and they seem to do well upon it. There are undoubtedly many points along the Yukon and Tanana rivers where sufficient hay can be secured every summer to keep cattle and horses over winter.

It is believed by well-informed men in Dawson that between 30 and 40 tons of gold will be taken out of the Klondike placers during the present winter. Most of this gold will be shipped to the United States upon the river and ocean steamboats next summer, and will prove an allurement, and thousands of people will leave their homes in the States and start for the gold regions.

Maj. J. M. Walsh, who is in command of the Canadian police upon the Yukon, and who is the highest official of the Dominion in that region, having supreme executive power, informed me that he proposed to rigidly enforce a regulation prohibiting any American or Canadian miner from entering the Klondike district who could not show 1,000 pounds of provisions in his outfit when passing the custom officers at Tagish House. He stated his willingness to bond American miners' outfits through British territory to Circle City or other points in Alaska. He also expressed the wish that the American Government would cooperate in enforcing a regulation which would bar any prospector or miner out of Alaska, as well as the British Northwest Territory, who did not carry a year's provisions as part of his outfit.

The Canadian police, by Major Walsh's orders, were supplying winter travelers upon the Yukon with provisions in cases where the same were needed, and refused to accept payment for the same. Major Walsh informed me that he had given away thousands of pounds of food this winter to people around the Upper Yukon. This food he purchased from miners and others, for prices varying from $1.50 to $2 per pound.

There is a well-defined movement in Dawson among pioneer miners looking to a stampede

across the hills to the Tanana in Alaska, 200 miles distant. Much dissatisfaction exists in Dawson over the Canadian mining regulations, and there is a freely expressed feeling against royalties, the cutting down of the size of claims, etc. This feeling is giving a decided impetus to plans looking toward a migration across into Alaska, where the mining laws are more liberal. There appears to be a striking uniformity of opinion among these men regarding the probability of finding gold deposits upon the Tanana. A few men have recently been prospecting over there, and have brought back remarkable reports to others upon the Klondike. I feel certain that before next summer has passed away hundreds of men, if not thousands, will be upon the Tanana. It is a river which can be easily reached from the Yukon from above or below Dawson by following up Sixty-Mile Creek or Forty-Mile Creek to the Tanana Divide, otherwise known as the Razorback. This ridge, which is easily ascended from the Yukon Valley, is not over 2,500 feet in height, according to observations with a boiling-point thermometer. It is always possible to strike a good summer trail across the hills from Dawson to the head waters of the Tanana without following either of the streams mentioned. The country is rolling, but not mountainous.

As yet there are no trading posts upon the Tanana, and in case of a large invasion of miners into that valley serious trouble is likely to arise over the question of supplies. I am informed that several trading companies propose to send boats up the Tanana next spring to the limit of navigation, hoping to reach a point nearly opposite Forty-Mile Creek. There is doubt as to the navigability of the Upper Tanana. Lieutenant Allen, who was the first explorer upon the stream, descending it in 1885, states that he believes the limit of navigation is in the vicinity of Bates Rapids, about midway the source and the mouth of the river. In 1890 I descended the Tanana, making a rough survey of the stream, and it is my impression that steamboats can ascend the Tanana almost to its head. There was a good stage of water when I floated down the river, whereas it is quite probable that Lieutenant Allen struck it at a time when the water was comparatively low. As no surveys have since been made upon the stream, it is largely a matter of speculation as to what can be done with steamboats plying upon it.

Mahlemute dogs are becoming very scarce along the Yukon, and are in great demand for winter sledging. Two winters ago many of the dogs died from the effects of an epidemic. At present good dogs of the native breed sell rapidly along the Yukon in the vicinity of Dawson at prices ranging from $250 to $400 each. These dogs are far superior for draft purposes in winter to Newfoundland or St. Bernard dogs. Experience has demonstrated that these outside dogs soon become footsore when traveling in winter. They can not stand prolonged exertion, being far surpassed in this respect by the Mahlemute or Indian dog. At present it costs about $3 per day to support a dog in Dawson, owing to the fact that salmon and other suitable food stuffs cost $1 per pound.

There was more than a dozen of cases of scurvy, well defined, in Dawson before I left there on December 20. Dr. Chambers, one of the most experienced physicians in the place, told me that he expected that several hundred cases of the disease and possibly many more would develop in camp before next spring. The disease takes on a severe form in the Yukon country, a number of old miners having died from its effects at Forty-Mile Creek in past years. Dr. Chambers attributed the disease to improper diet, or rather the lack of sufficient variety in food. It is possible that there is a sufficient supply of bacon and beans in Dawson to avert any cases of actual starvation until next spring. But it goes without saying that in case other food stuffs can be secured or imported by way of the upper river the condition of the miners will be very much better and the progress of scurvy checked.

It is my opinion that the food supply of Dawson is inadequate to meet the demands of the population until the middle of next July, when the first steamboats will arrive. The condition of affairs is made worse at Dawson by reason of the fact that no provisions can be secured this winter from Fort Yukon, owing to the scarcity of supplies at that point, and it would seem that every pound of provisions which can be taken into Dawson this winter, either by Government expeditions or by private enterprise, would be acceptable. If the present outlook does not mislead, there will be 10,000 people entering Alaska and the British Northwest Territory within the next six months, and famined conditions will become more accentuated.

The possibility of taking supplies through to Dawson from the Pacific coast depends largely upon the condition of the trail. If Dalton's route over the hills be followed, the stretch of open water along the Yukon between Lake Labarge and the Hootolinqua, some 30 miles, will be avoided. If the relief expedition, however, proceeds over the Upper Yukon lakes it will encounter the difficulty of getting around this open water. When I came out a few weeks ago it was found possible to make a detour of the hills for a portion of the distance, and I believe that a military road could be easily cut through the entire distance back from the river, as the hills are not precipitous, nor is the forest growth extremely heavy. The task might require several weeks time, but the result would be a permanent benefit, as the open water mentioned causes trouble every winter to travelers and a road constructed around through the hills would be of permanent value.

The Skagway trail is in fine condition this winter. I came across it in a day and a quarter with dogs and sledges, the last day's run being 32 miles. Hundreds of people were on the trail, moving backward and forward. As I descended from the summit toward Skagway the throng of people rapidly increased in numbers. From appearances there were nearly 10,000 people in Skagway and the immediate vicinity, the majority of whom were moving or preparing freight up over the Skagway trail. A report from Dyea indicated trouble on that pass, a snow slide having temporarily stopped traffic. The Canadian police were portaging considerable quantities of provisions over the Skagway trail, using horses and large sledges. I believe that the Skagway route is better in winter than the Dyea or Chilkoot route to the Yukon.

The temperature in the Yukon Valley during the present winter is above the average. Only once for a few hours did the thermometer drop to 60° below zero at Dawson. Colder weather was experienced on the Upper Yukon in early December than was noted in January. While coming out I noticed considerable open water in places along the river. At some points the ice was thin and detours had to be made. My observations, using the thermometer during the early part of my trip out from Dawson, indicated an average of 18° below zero. At Pelly River an Indian broke the thermometer, and further observations could not be made, but it is my belief that at no time during the following days of January did the temperature fall to more than 20° below zero.

There is a plentiful supply of timber along the Klondike and at Dawson. It is not an open, treeless locality, as has been frequently stated. Heavy spruce forests are found upon the Lower Klondike, the trees in many instances being 12 and 15 inches in diameter. There is plenty of timber, both green and dried, along the Yukon, from its head waters to Fort Yukon. The forest growth is also heavy in the Tanana Valley, although the trees will not average more than 10 or 12 inches in diameter. Fairly good lumber can be produced. The growth is mostly northern spruce, with some birch, and willow interspersed.

Considerable fresh meat was taken into Dawson by various individuals last fall. Beef cattle were driven in over the Dalton trail, slaughtered at Pelly River, and the meat rafted down to the Klondike. Several hundred head of sheep were also brought through to the camp. Two rafts loaded with beef were stranded some distance above Dawson, but most of the meat has been sold, not more than 10 or 12 beeves remaining at either point. Numbers of caribou were slaughtered upon the Upper Klondike early in the winter, when a large herd of the animals passed on their annual migration. Some 40 moose were also killed in the same vicinity. There is at present little or no meat upon the Yukon above Big Salmon River.

ALASKA.—1898.

RELIEF OF THE DESTITUTE IN THE YUKON REGION.

Capt. P. H. RAY and Lieut. W. P. RICHARDSON.

SUFFERING AND DESTITUTE MINERS IN ALASKA, AND WHAT WAS DONE FOR THEIR RELIEF.

By Capt. P. H. RAY and Lieut. W. R. RICHARDSON.

The following reports from Captain Ray, Lieutenant Richardson, and others, interested in the development of the Yukon region, comprise a chapter without which a history of the efforts of the War Department to relieve the suffering miners on the Yukon would not be complete These reports follow each other in as complete a chronological order as circumstances will permit:

ST. MICHAEL, ALASKA, *August 25, 1897.*

SIR: I have the honor to report my arrival here on the 18th instant. The steamer *Hamilton*, with which the steamer *Cleveland* was expected to connect for the upper river, sailed the day before our arrival.

There are two river steamers of this line now overdue, one of which (the *Healy*) is storm bound to the northwest of the island and will probably reach here to-day, in which event I will get off to-morrow.

The steamer *Portland* sailed for Seattle on the 17th. From good authority I learned she carried less than $100,000 in gold, principally from the Klondike mines.

I am unable to obtain here any reliable information as to the number of people now in the United States territory on the Upper Yukon or the amount of food supply, as the agents on the upper river do not make any reports here of the amounts on hand.

From the agents of both companies located here I learned that since the opening of navigation this year they have forwarded to Circle City and above 2,490 tons of freight, which does not include that carried by passengers, three-fifths of which was provisions, the balance clothing, machinery, hardware, and liquor.

During the same period they have transported up the river 302 passengers, and there are 405 here awaiting transportation, 170 of whom will go by the *Healy*.

There are 113 that came on chartered vessels who are attempting to go by small tugs and barges. The companies expect to land at Dawson City and above at least 500 tons of provisions before navigation closes, and will have at Andrafsky, 200 miles up the Yukon, 2,000 tons ready to be sent up the river as soon as the ice goes out in the river, and before navigation opens here.

The storage capacity here is at present inadequate to accommodate the suddenly increased volume of trade, but both companies are putting up new buildings, and by another season will be able to meet all demands.

I learn from Mr. Ogilvie, surveyor for the Dominion Government, who left Dawson City July 15, and Father Rene, superintendent of Catholic missions, who left there July 27, that there was at Dawson City and vicinity at the time they left about 3,000 people; that there was no scarcity of provisions, and the stores all had sufficient supply to meet all demands unless the numbers coming via Chilcoot should increase the number to 5,000 or over, in which case there would be, undoubtedly, a shortage.

Father Rene stated that Circle City seemed practically abandoned, there being upward of 400 vacant houses there.

The companies here have the following means of transportation:

Alaska Commercial Company has three river steamers, 200 tons each; three river barges, 300 tons each. They expect to build this coming winter one steamer, 200 tons, and three barges, 300 tons each.

North American Transportation and Trading Company, three steamers, 200 tons each; one river barge, 200 tons (just being completed). They expect to build this coming winter two river steamers, 200 tons each, and three river barges, 300 tons each.

This harbor is very poor and unsafe in any gale blowing from the north and east. Vessels drawing more than 16 feet of water can not approach nearer than 1½ miles to the wharf.

The risk of river steamers in crossing the reach of 60 miles between this point and the mouth of the Yukon is also very great and often causes delay. The pilots inform me that they can carry but 3 feet of water across the bar at the mouth of the river and the same over the bars above the ramparts. This fact does not seem to be generally known, as there are two outfits now here, one of 68 men and one of 45, who came from San Francisco, Cal., equipped with screw tugs that draw over 4 feet of water light.

In view of the great commercial interests involved and the importance of increasing the facilities for supplying the rapidly increasing population of the Upper Yukon, a survey of the Yukon should be made at the earliest practicable date, with a view of finding, if possible, a pass farther south that will admit vessels of greater draft of water and perhaps secure a better harbor for seagoing craft. Natives report a deeper channel to the south.

So far as I am able to ascertain, but very few of the people now entering by this route intend to remain or locate in United States territory unless some new discoveries of gold should attract them.

The abuses of any adequate means of enforcing the laws within the limits of our Territory is greatly deplored by all the better class of people entering it, though up to the present time I have heard no complaints of lawlessness.

Petitions are being circulated here petitioning Congress to divide the Territory and erect a full Territorial government in North Alaska.

I will report more fully upon this subject when I ascertain more fully the conditions existing in the interior and the number and character of the citizens.

Should it be decided to send troops into the Territory the Department will be able to obtain ample warehouse accommodations here.

Will report further before sailing.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

ST. MICHAEL, ALASKA, *August 27, 1897.*

SIR: I have the honor to report that the steamer *Healy* arrived on the 25th, nine days out from Dawson City. She brings 45 passengers, and they all report a very serious condition of affairs in the Klondike district.

They state that even before the arrival of the *Healy* the stores refused to sell in large quantities, and, while the immediate tension was relieved by the arrival of three steamers, the fact still remains that there is not sufficient food supply in the country (even when augmented by all that can be sent forward from this point) to feed the people now there until the opening of navigation next spring.

The condition is being aggravated by large numbers of people arriving daily via the pass.

There is but a very small supply at Circle City, but I am reliably informed that 80 miles from that point, in the Birch Creek district, there is a sufficient supply of food to last 2,000 men one year—left there when the rush for the Klondike occurred.

The action of the transportation companies in forwarding large quantities of liquor during the past summer (at a time when it was generally known that the food supply was, to say the least, limited) is severely criticised by all good citizens and has greatly aggravated the present conditions.

I have consulted with the agents of both transportation companies, and they freely admit that the situation is extremely critical; that a famine is unavoidable unless a part of the people leave the country.

They expect that the three boats now preparing to sail will bring down as many as possible, but the number will not be sufficient to affect the general result unless a large number go by the pass. The disposition of the people here to go on in spite of the conditions savors strongly of insanity.

The agents of both companies called upon me last evening and expressed their fears that the people now stranded here, augmented by those to arrive by river and sea, would prove a serious menace to life and property, and asked if I could render them any relief. I informed them I could not, but if they would submit their statement in writing I would forward it. They did so, and I made it the subject of a telegram.

From what I have seen and heard here, I think their fears are fully justified, but I do not think it will be necessary to make the station permanent; for with a better knowledge of the conditions and increased facilities for transportation, there will not be any necessity for a force here.

I would recommend that until some form of law is established in the territory a cutter or gunboat be kept here during the open season.

The boat I am to sail on expects to get off to-night or early in the morning.

As I am closing this report I am within hearing of a heated discussion among the dissatisfied passengers of the steamer *Healy* as to the methods to be adopted to regulate the officers of the transportation company to suit their peculiar views. This has been quite frequent lately. There is a turbulent element now coming into the country that will have to be controlled, and so long as the present chaotic conditions exist it will be necessary for the Government to take some prompt action to check lawlessness and provide some provisional form of government to meet the emergency next spring, as there will undoubtedly be a great rush to this country when the large amount of gold (something over one million) carried down by the *Excelsior* and *Cleveland* becomes known.

I learn from Mr. Ogilvie that on the Dominion side the enlisted force of police has not exceeded 25 men, but they are now increasing it to 75 to meet the demands of a rapidly increasing population; also the fact that a more turbulent element is coming into the country. From people returning I learn that their system has proven most satisfactory, and that the system of enforcement of law is much superior to that existing on our side of the line.

From what I have seen I am of the opinion now that so long as the present chaotic conditions exist some semimilitary form of government would most readily meet the emergency; for if a full civil form of government should be established it would be very difficult, under present conditions, to obtain efficient officers to enforce the laws.

As the population is transient, none are here to settle permanently, but to make their fortunes rapidly, and it will be very difficult to obtain officers who will be willing to give their time or attention to their duties, or who will even remain long enough in one place to qualify, as the present mining district is along the border, and they will be located one day in the United States and the next in the Dominion.

I have not yet seen enough to judge accurately, on the whole, but I am well satisfied that at present a small force (say 60 men) is all that will be necessary to give moral effect, provided there is an active and efficient officer in command, who can and will act promptly and justly and who will devote all his time and energies to his duties.

At the mining centers the question assumes a most serious aspect, for I think the future welfare of the whole territory and the safety of the capital now invested here depend greatly upon bringing the lawless element under control at the very beginning. The conditions are new and may have to be met with new methods. After looking over the conditions in the upper country, I will report more fully by return steamer.

Very respectfully,

P. H. RAY.
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

ST. MICHAEL, *August 28, 1897.*

DEAR MAJOR: We have been delayed till to-day on account of the rough weather, which prevented the river boat getting around the island. She is all loaded now, and will pull out in a few hours unless the wind comes up again.

Ray sent by the *Excelsior*, which sailed for San Francisco night before last, a request made on him by the companies here for a detachment of soldiers to come to this place for the winter. The request will be telegraphed to Washington from San Francisco, and you will probably know of it before this reaches you. He asked for two officers and twenty men. The Alaska Commercial Company has a building for them here, and will furnish them supplies and furs. The situation here is this: Both transportation companies have large quantities of supplies and no law or means for their protection. From present indications there will be a number of people stranded here for the winter; some from the States who can not get up the river, and others driven out from the mines, on account of scarcity of provisions, who can not get farther south.

This is no place to keep troops, and the detail would not be needed probably after the ice breaks next spring. I should not favor sending up troops to remain here, anywhere in the Territory, under the present conditions, or establishing a post for several years. A special provisional government should be established, purely executive, and a system of mounted police organized, similar to that in the Northwest Territory. You know it will take extra pay to hold men in such a country.

We have a pretty tough element going up on our boat. They are threatening the boat captain before leaving the dock. The *Excelsior* took down about $1,000,000 in gold. Our boat from up the river—the *Healy*—brought down only a trifling $100,000. We bought some dogs here and have hired a man to look out for them. Our supplies came through all right, and I think we have everything we need. I will get off at Circle City and Ray will go on up to Dawson and come back down by the last boat. Will write you again then.

Yours, truly,

W. P. RICHARDSON.

Maj. T. H. BARRY, *United States Army.*

[ST. MICHAEL,] *August 29, 1897.*

MY DEAR MAJOR: Richardson tells me what he has written you, and I hope that if not too late you will have something to do with the selection of the officer sent here should the Department send a detachment here. The situation is quite delicate and may need a level-headed man. I hope for the best, but we should be prepared to meet the possibilities under existing conditions. There are over 200 people now stranded here, and the *Humboldt* just came in with 230 more, who can not possibly go up the river before the river closes, and I learn that more are on the way.

I do not think it necessary to keep a guard here after navigation opens, provided the transportation companies fully realize and keep this place from being congested with a mob next year. We are not dealing with sane men, but a crowd of gold lunatics.

The steamer I am on has been delayed by arrival of some of the companies' people by the *Humboldt*, and we will get off in about an hour.

Urge the necessity of prompt action on the part of the Government to meet the emer-

gency next spring by some provisional semimilitary government to control the crowds coming into the Territory next spring and keep things in shape until the excitement subsides.

Look up the Dominion mounted police. I shall recommend something on that line, to use selected noncommissioned officers and privates of the Army, who can act as constables, with extra pay for civil service, and lieutenants for inspectors and subinspectors. I will fully outline it in my report.

Will write you more fully from Circle City or above.

Sincerely,

P. H. RAY.

Maj. T. H. BARRY, *United States Army.*

STEAMER HEALY, 100 MILES BELOW LEWANNAH RIVER,
September 6, 1897.

SIR: I have the honor to report that we have just met the steamer *John J. Healy*, two days out from Old Fort Yukon.

They report the water too low at that point to cross the bar; that her cargo was landed at Fort Yukon, and she is now on her return to St. Michael.

This means there will be no more supplies landed in the Klondike country this fall by this route, with all the attendant results of at least 6,000 people without food and winter coming on.

I shall go to Circle City by whaleboat.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL U. S. A., *Washington, D. C.*

The following is a communication received by Maj. Thomas H. Barry, assistant adjutant-general, from Lieut. W. P. Richardson:

FORT YUKON, ALASKA, *September 13, 1897.*

We arrived at this place about 6 o'clock last evening and seem likely to remain. The river is so low that it is very doubtful if our boat can proceed farther. The river in this vicinity widens out to several miles, passing through many channels over what are known as the Yukon flats. The river is very low, and just above here is a bar over which the water is said to be not more than 2 feet. Our captain has been searching all morning for a channel, but so far without success. Our boat draws from 3½ to 4 feet. If no channel is found she will unload her supplies here and return to St. Michael, Ray and I will put our stuff ashore and go into camp for the present and wait for the river to freeze. That is likely to occur now very shortly. We can then proceed with dog teams up to Circle City. Other boats are on the river coming up with supplies, and will all have to discharge here. This means a very serious condition of affairs up at Dawson City; in fact, nothing less than starvation. Already small boats are coming down with parties of three or four looking for supplies. A large number are expected down before the river freezes. When that happens they will begin freighting up with dogs, but that is a slow process.

I doubt if there is enough food on the river, even if it could all be distributed, to feed the people. Young Gage is here, and says he is going back to the States without delay and try and have a relief expedition started in over the pass as early as possible. There has been bad management in the companies, particularly in bringing so many people into the country, however the majority of them have come in by other means. Circle City is about 90 miles farther up. I understand it is now practically deserted, and the only advantage apparent now in our going there would be to get our mail. We may not move our base from here, but send up from time to time for mail and reports of the situation. Ray is very anxious to get through to Dawson some time during the winter; that is about 400 miles from here. In forwarding our mail I think

it would be best to have it done up from time to time in one secure package, and addressed to Ray. We will get it sometime, I suppose.

The trip up the river was pleasant enough except the last three days, during which it has been raining and snowing, with the thermometer ranging from freezing down to 18° or 20°. About half our passengers got off at a place called Rampart City, about 200 miles below here, a new mining camp near the Manook Creek diggings. They have about 350 people there and expect a number more. Some good claims have been discovered and the prospects are good, some say, for a second Klondike. The remainder of our passengers, about 75, will, I think, either return there or go back to the States. A few may stay here. This place lies a few miles within the arctic circle, is unsheltered, and they say very cold. There is plenty of timber however, and with food they can get along.

Ray joins me in kind regards.

Yours, truly,

W. P. RICHARDSON.

True copy of letter this day received and furnished the Adjutant-General United States Army for his information.

THOMAS H. BARRY,
Major and Assistant Adjutant-General.

VANCOUVER BARRACKS, WASH., *October 20, 1897.*

[Telegram.]

TACOMA, WASH., *September 13, 1897.*

Reports here indicate food famine Dawson City. Can revenue cutter be sent to St. Michaels to secure reliable information and report here? Would ask your permission to send representative citizen and form relief bureau at Tacoma at once.

TACOMA CITIZEN COMMITTEE.

The SECRETARY OF WAR,
Washington:

[Telegram.]

SAN FRANCISCO, CAL., *September 15, 1897.*

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

I submit the following application, made to me this day:

ST. MICHAEL, ALASKA, *August 26, 1897.*

Capt. P. H. RAY, *United States Army.*

DEAR SIR: Believing the situation to be critical, owing to the number of people now here and reported to have sailed for this point without visible means of reaching their destination, and the certainty that a large number will be stranded here for the winter in a state of destitution after navigation by sea closes, which will jeopardize large property interests, and owing to the absence of civil authority here, we request that a suitable guard be sent for the protection of life and property at once.

We remain yours, very respectfully,

JAMES M. WILSON,
Superintendent Alaska Commercial Company.

S. B. SHEPPARD,
Manager at St. Michael.
The North American Transportation and Trading Company, St. Michael.

From my own observation and knowledge I believe the conditions stated exist, and recommend that 2 officers and 20 men be sent to St. Michael by return steamer. Alaska Commercial Company have ample supplies and winter clothing; will subsist command and furnish quarters at reasonable rates. Should remain until relieved by other command, cutter, or war vessel.

RAY, *Captain.*

FORT YUKON, ALASKA, *September 15, 1897.*

SIR: I have the honor to report my arrival at this place on the 12th instant, since which time the captain has been making every effort to get the boat over the bar. Having failed in every attempt, her cargo has been discharged here, and she leaves for St. Michael in a few hours. It has been snowing steadily for the past four days, and if cold weather continues the river will soon close. This leaves the situation at Dawson City and above unchanged, and there exists no possible hope of getting supplies into the Klondike country by the river route this fall. I find Mr. Ely Gage here, he having just come down from Dawson by small boat. He reports that the people at Dawson had not been advised of the condition of affairs here when he left, August 18. Word had been sent from here by Indians four days before my arrival, which renders it unnecessary for me to go forward at once, as I intended, Mr. Gage also reports that the supplies in the stores at Dawson when he left were very low, and nothing had been delivered there by either company since that date, except one large load of liquor and boots.

Under existing conditions, and in view of the great interests, both national and commercial, connected with the fact that the great influx of people to the Territory is accompanied by a lawless element that must be kept under control, I deem it very necessary that the military force should be permanently located at a central point in the interior, not only for the moral effect, but to support the civil authorities in the execution of the law whenever the time comes to give the country a full civil form of government. I am of the opinion that one company of infantry, with carefully selected officers and men, will be an ample force to meet the requirements, as all settlements and camps are located along the Yukon, and a single point will control this great highway. I recommend that this force be supplemented by a detachment of 20 enlisted Indian scouts. They will be valuable as scouts, guides, boatmen, and hunters, and will secure to the service the friendship of the natives. One additional lieutenant should be sent to command them, who should be selected for his zeal and energy and who will take an interest in the work. He should be well equipped to perform the duties of an engineer officer, and can be profitably employed in the work of exploration, locating roads, trails, etc.

I recommend that a post be located on the north bank of the Yukon River opposite and a little below the mouth of the Tanana. The position is central, both geographically and commercially. It is at the confluence of the two great navigable rivers, and with the development of the Territory must become its greatest commercial center.

Circle City, the other point to be considered, is now practically abandoned and its future reoccupation extremely doubtful, and in all probability it will fade out as soon as the Birch Creek mines, which created it, are worked out. I learned from miners from that district that the winter diggings are practically worked out at the present time. I am informed by Mr. Ogilvie, surveyor-general of the Dominion government, and other reliable parties, that it is situated on low, swampy ground, and that there is no timber suitable for the construction of a post below the boundary. I regret that I am unable to speak from my own knowledge, owing to my failure to reach that point before sending this report. Another most serious objection to the locality is the liability of having communication cut off by low waters, as I witnessed this year. I landed at the mouth of the Tanana and spent the most of one day exploring both banks of the river. The ground I have selected is high and dry, with a permanent gravel bank and excellent landing at all stages of the water. I did not find any large timber in the immediate vicinity, but excellent saw timber (spruce) can be had in great abundance from 5 to 10 miles up both the Yukon and the Tanana, which will make the delivery at the post easier and cheaper than by hauling. There is a great abundance of excellent timber for fuel on the site, as the forest of small spruce and birch will have to be cleared for the post. It is 80 miles below Rampart City (Manook mining district) and 897 miles from St. Michael. The trader, Mr. Mayo, reports that moose and caribou are quite plentiful, and the climate is said to be the mildest in the Territory. Whitefish can be taken in great abundance in the winter and salmon in summer. I posted a notice reserving 10 miles square in the event the Department should wish to set aside any portion of it. Should the site I recommend be selected, I think it would be advisable to set aside a timber reserve on the Tanana or Yukon above the post. I will make every effort to reach Circle

City, examine the country, and make a report that will reach your office, if possible, before final action is necessary. Should the Department decide to locate a post at either site, the work could be greatly expedited if I could be authorized, when I come down the river in the spring, to make contracts with the natives for the delivery of logs and clearing the site for buildings. I submit rough estimate of equipment. As I came away without books of reference, I have been obliged to depend entirely upon my memory as to names, etc. I hope some experienced officer will look over the lists and supply my omissions.

The Yukon and its tributaries are the great routes of travel, and must be for some time to come the highways for the transportation of supplies of the people in our Territory and British North America, and while the immigration will be by various routes, the people, once in the Territory, will be compelled to follow the waterways, owing to the absence of all animal transportation except dogs in the winter. With steamers and barges of proper construction and draft, the capacity of the Yukon is limited only to the number of vessels engaged in the work; and should the south pass of the delta be found to be navigable, the open season will be much extended, the routes from the States shortened by nearly 300 miles, and the dangerous traverse for river boats from St. Michael to the mouth of the Ahpoon Pass avoided. As I learn from the miners that horses were used to advantage in transporting supplies from Circle City to the Birch Creek mines during the summer and are now in use in and around Dawson, I see no good reason why they can not be successfully employed in the interior at all seasons, especially south of the Yukon and the valley of the Tanana. For this reason I have asked that 6 Canadian horses be supplied the new post, if established, and recommend that the Department of the Interior be requested to send to the post next winter 100 reindeer for winter use. They are superior to dogs in every respect, especially in supplying themselves with food, and superior to horses when long distances are to be covered rapidly. They could be utilized at once in opening a winter mail route via Tanana and Cook Inlet, should that route prove practicable. At least two Laplanders should be sent with them to take charge and instruct the natives and whites in their use. Dr. Sheldon Jackson, of the Bureau of Education, has 1,500 head at Port Clarence, and says he will be glad to cooperate in obtaining all we need for military purposes.

Of the settlements within our territory but few, if any, can be called permanent, as new interests will necessitate many changes. Outside of St. Michael the North American Transportation and Trading Company has a store at Circle City, and I learn are about to establish one at Nukeukahyet and at Rampart City (Manook Creek). The missions at Kudlik, Anvik, Nulato, Tanana, and Fort Yukon are simply native settlements, aside from the priests and sisters engaged in the work. The Alaska Commercial Company has stores at Andreasfky, Nulato, Nukeukahyet (Tanana), Rampart City (Manook), and Circle City. The white settlements are Circle City and Rampart City, the first 1,200 and the second 977 miles from St. Michael. Circle City is practically abandoned. Miners arriving here since I landed report only 30 people there, and they were waiting for a boat to get away. The principal mining camps are Forty Mile, Birch Creek, and Manook Creek. Rampart City had a population of about 350 on the 7th instant, which includes those in the mining camp 12 miles away. I counted 70 tents, 1 store, and 10 huts. The people were getting out logs, whipsawing timber, and new cabins were going up rapidly. The town of Weare I found represented by 4 spruce logs crossed as a foundation for a cabin; population, 0. It is located three-quarters of a mile below the Alaska Commercial Company's store at Nukeukahyet. This is a central location, being practically at the head of navigation for river boats drawing more than 5 feet of water, and is opposite and a little below the mouth of the Tanana. With the development of the Territory it will become an important center, commercially and politically.

The location of other towns can not be predicted from geographical conditions, as they will necessarily follow the mineral development, and nearly all those evolved from placer discoveries will be ephemeral, and abandoned as the district is worked out. I find but three mining camps within our territory, already mentioned. The first two—Forty Mile and Birch Creek—were abandoned when the discovery was made in the Klondike. Since then miners have been slowly drifting back. I have reliable information that unless people from the Klondike come in they

will soon be deserted. The great lack of sufficient food supply has checked nearly all development for this winter. I did not have time to visit the mines at Manook, and can not speak as to their value. I saw over $300 in nuggets and dust alleged to have been taken out of a 10-foot hole on one claim, which claim was sold for $5,000 to some parties on this boat. Many miners coming down from the Klondike are stopping there, and many coming into the Territory by this route will stop rather than winter here, where there is no chance to work. Owing to the dense growth of forest and moss, the country is one of the most difficult in the world to prospect, and the work of development will be slow. I have talked with many experienced miners, who all agree in having discovered many valuable lodes of low-grade ore, but the present high price of provisions bars the working of any placers or ledges that do not pay more than an ounce per man per day.

Up to the time the boats failed to pass the bar at this point I estimate that from the boundary to the sea there were about 1,200 people, not including those stranded at St. Michael. The only lines of communication are by the waters of the Yukon and its tributaries, which are open from the last days of May until from the 1st to the 15th of October. There is no regular communication between the mining camps during the winter and no mail facilities between Circle City and St. Michael during the same period. In my previous report I have noted the transportation facilities now in existence on the Yukon and what preparations are being made to meet next year's business. The steamers on the river seem ill suited for the upriver work. I am reliably informed by Mr. Prevost, the Episcopal minister at the mouth of the Tanana, and others that there is a practicable route from the Tanana across the divide to the head of Cook Inlet via the head of Copper River; that Indians pass to and fro, trading, during the winter. If this information proves correct, I believe pack animals or wheeled transportation could be placed on this route in the summer and a better and shorter route opened to the mines in our own territory. From all I can ascertain, I am now of the opinion that as soon as the development of the Territory will justify, this will be the shortest and most practicable route for railroad communication with the open sea. With rail communication from the head of Cook Inlet to the Tanana, the commerce of the whole Yukon Valley could be controlled by routes lying wholly in our own territory. Should I be able to obtain a sufficient number of suitable dogs, I will attempt the exploration of this country during the coming winter or make it my first work should I remain in the Territory. There is another route which leaves the Tanana about 300 miles above its mouth and strikes westerly across the divide to the head of the Kushkokwin. Communication can be held by sea to the mouth of this river a month earlier than with St. Michael. This route should be explored as soon as practicable.

Up to the present time the laws in this country have not been enforced, nor does there exist any means of enforcing them. All questions in dispute, criminal or civil, including rights of property, have been and are now settled by miners' meetings, which practice has proven satisfactory under the old conditions of simple disputes between honest men, but is ill suited to present conditions and those which will arise and must be met within the next twelve months. I do not believe it would be possible to obtain civil officers who will remain in one place long enough to be of any service, and the performance of their duties will be secondary to their interests in mines; and where discoveries are being made on both sides of the border the civil government is liable to migrate to a foreign soil at any time a new discovery is made there. I learned from Mr. Gage that the commissioner recently appointed for Circle City has stopped at Dawson and in all probability will never qualify; that Mr. Ross, the collector at the same place, has spent a large portion of his time in the Klondike. In view of such facts and the anxious inquiry, "Is the Government going to give us any form of law or protection of life and property?" made by people who have large interests at stake, I respectfully suggest that the Territory be separated and the northern portion be given a provisional form of government of a semimilitary character; that the governor and secretary be officers of the Army, appointed by the President, with an enlisted police force 20 strong, sufficiently well paid to secure reliable men; that officers of the Army be detailed as inspectors and subinspectors, with powers of a magistrate; that at least two district judges be appointed and a superior court be established at the capital of the Territory, and noncommissioned officers and privates of the regular force be made eligible for detail on the

police force in cases of emergency, and when so serving receive additional pay; that the office (civil) of commissioner of mines be established, with power to settle all disputes arising as to property and rights of miners in placer diggings, and that his duties and jurisdiction be defined by law; that Congress shall enact all laws for the government of the Territory, as is now done for the District of Columbia.

This government should remain in force only until such time as the condition of affairs shall become more settled and the Territory has sufficient population to justify full civil form of government. I can devise no other method to meet promptly the emergencies of next spring, and if Congress at its next session should see fit to enact such a law it will, with the opening of navigation, at once give to the Territory what every good citizen is now asking for, viz, "protection to life and property," and if continued for only a year will tide over the critical period and give to the Territory officers who can devote their whole time to their duties and to the development of the country, unprejudiced by local or personal interests. Should a provisional government be established, I recommend that the Government have constructed and put together at St. Michael a strong river steamer of 150 tons capacity, to draw not more than 24 inches loaded, to be used in supplying outlying stations, patroling the river, and in relief of people in distress. Could such a steamer be available here now much suffering could be relieved.

I shall go to Circle City as soon as I can obtain sufficient transportation for my supplies, as there is practically nothing there, and shall communicate at once by mail. Should I not receive any order to the contrary I will proceed to St. Michael by whaleboat as soon as the ice breaks up in the spring, and await farther orders there. We have ample supplies, are both in good health and condition, and will devote the winter to the work of exploration.

Very respectfully,

P. H. RAY, *Captain, Eighth Infantry.*

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *September 16, 1897.*

SIR: I have the honor to report that since closing my report of yesterday the North American Transportation and Trading Company's steamer *Weare* arrived with a cargo of 200 tons of provisions, principally staples. The captain reports that she is probably the last boat of that company for this season.

The Alaska Commercial Company expect one more. Boats containing from one to four men each are coming down daily. They report that the condition of affairs here is still unknown in Dawson, and the steamers *Healy* and *Weare* are due there about this date and are looked for.

There will be at this point when river navigation closes, about 600 tons of provisions. Several newspaper men are going to the States with a view to organizing relief expeditions, and have various projects. This point is 370 miles from Dawson City. After the river freezes the trip can be made with dog teams (loaded) in from twenty-three to twenty-eight days. I believe this is the most practicable, and in fact the only point from which any real relief can be sent to those who are destitute in the Klondike country. I shall do all I can to encourage and assist the forwarding of supplies, also to protect the caches from raids.

There are now here 130 people. There is much dissatisfaction among some of them over the failure of the transportation company to forward them to their destination. There have been many threats and some show of arms to-day, but I believe it will be settled without violence, as Mr. Ely Weare, vice-president of the company, arrived to-day and favorable concessions have been made to them. There are several people here without food or money. I understand the steamers will carry the most of them down to St. Michael, but this element will become a serious factor after navigation closes and they continue to come down the river.

Very respectfully,

P. H. RAY, *Captain, Eighth Infantry.*

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

CIRCLE CITY, ALASKA, *October 3, 1897.*

SIR: I have the honor to report that on the morning following my arrival here I proceeded by the steamer *Bella* up the river to look over the country between this point and the boundary, intending to go to Dawson City, Northwest Territory, if possible. The location here is poor, as outside of the immediate vicinity of the city the country is low and flat for several miles up and down the river. The beach upon which the city is built rises about 6 feet above high water. Ten miles above here the upper ramparts are entered, which is practically a canyon from that point to the boundary, the mountains rising abruptly from the river. I saw but few open valleys or benches that were above high water, and only one that I consider would make a suitable site for a post. This is at the mouth of Mission Creek, which empties into the Yukon by the south, on the left bank, 20 miles below the boundary and 130 miles above this point.

Here the mountains fall back from the river, leaving a level beach of several hundred acres, which is 15 feet above high water, with strong gravel banks and a good permanent landing. There is an abundance of good saw timber in the immediate vicinity. Should the Department decide to establish a post on the upper river I recommend this site, as it is near to the boundary, will be a most suitable point for the location of a custom-house, and the Treasury officials to check, if possible, the violation of our revenue laws.

I am reliably informed that smuggling is extensively carried on at the present time. Should it ever become necessary, in enforcing the law here, to have a force in this city, a building for a small detachment could be erected and made a subpost to that at Mission Creek. For cogent reasons I deem it for the best interest of the service to locate the permanent garrisons well away from the mining towns, so that the troops, if required to act, will not be biased by local influences.

Upon my arrival at Forty Mile River, on the 29th ultimo, I found that river frozen over, the temperature having fallen to 10° F. the previous night. Soon after landing the steamer *Weare* came down from Dawson City. As the ice had commenced to run in the Yukon and the weather being clear and cold, knowing from experience how quickly rivers in this latitude close under such conditions, I decided to get back to my base of supplies at Fort Yukon, if possible, where I had left Lieutenant Richardson with the provisions and outfit. The captain of the *Bella* having refused to take it on board, when I came up, I at once transferred to the steamer *Weare.* She sailed early the next morning and arrived here at 11.30 a. m. October 1.

The ice was running heavy all that day, and the captain (Marinor) decided that the risk to the steamer was too great to attempt to go farther, so on the morning of the 2d he moved her a few hundred yards up the river to the mouth of the slough, where she now lies frozen in. There were 107 passengers on board, who at once protested against his action and called a miners' meeting, which I will make the subject of a separate report.

The ice is gorging opposite the town and the river is practically closed for this season. As soon as the ice becomes firm I shall proceed to Fort Yukon by dog teams.

I have ordered an outfit of dogs by the steamer *May West* and expect to find them at Fort Yukon on my arrival there. I shall then visit the Birch Creek diggings and return here, where I have secured quarters for the winter. I also have quarters at Fort Yukon, where my stores are well secured.

The question of force here is a very serious one and the action of the N. A. T. and T. Co. is causing much friction. I used my best endeavors to reconcile all differences peaceably and get all people who are without provisions down to Fort Yukon as soon as possible, where there is an abundance of food.

Among the people who came down on the *Weare*, I found several reliable men, and from them I learn that while food is scarce in Dawson City, the miners in the outlying camps are fairly well supplied. The stores (two) are selling very conservatively. The eating houses were all closed but one when the steamer sailed, and that one was open for two meals a day, one hour for each meal.

The latest arrivals over the pass, who are in many instances without food, are much exercised and frightened; many are turning back by the way of the pass and others are making their way

down the river to Fort Yukon. Two boat loads (ten people) landed here last night before the river closed. They had made the run night and day.

While I consider the situation critical, I do not believe there will be any great loss of life beyond that incident to a climate so rigorous as this. That there will be much suffering along the river and trail owing to the rashness and ignorance of people unaccustomed to this climate no well-informed person here will deny, but there is nothing that should cause undue anxiety or alarm among people in the States who have friends in this country.

There are fabulous stories being circulated and will be published about the prices paid for food. I have verified instances where $100 was paid for 50 pounds of flour, but such cases are rare, were outside deals, and not the prevailing price.

There is not any regular system of mails in existence here; shall get reports out by every opportunity.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

CIRCLE CITY, ALASKA, *October 6, 1897.*

SIR: I have the honor to report that after having completed my observation up to the boundary, and from all I have been able to ascertain relative to the present and future developments of the Territory, I am still of the opinion that the location at the mouth of the Tanana is the best and most suitable for the first and largest military post. Should the people return to our side of the border in any great numbers, and I believe they will, a detachment such as I have mentioned in former reports, could be sent here should it ever become necessary to sustain the civil magistrate. With a better understanding of the conditions, I am of the opinion that at least two companies of infantry should be sent to supply the necessary detachments and keep an efficient force at the post.

My reasons for preferring Tanana to Mission Creek or any point above the upper flats is that it will always be accessible to heavy-draft river boats during the open season, can more readily communicate with the open sea by an overland route during the winter, is a geographical center, will be the most suitable location for the future political capital, and, from all I can learn, will be the center of the gold fields of North Alaska. Should the Department decide to send two companies, my estimates for supplies, clothing, and means of transportation should be modified. I believe that I omitted to ask that 1 engineer, 1 sawyer, 1 blacksmith, and 2 carpenters should be sent with the command.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

CIRCLE CITY, ALASKA, *October 6, 1897.*

SIR: I have the honor to report that since leaving Fort Yukon I have witnessed several miners' meetings and noted their action.

The first took place the night I arrived here on the steamer *Bella*. About 8 p. m., while ashore soon after my arrival, I was informed that a committee of miners had taken charge of the boat and were about to commence discharging her cargo. I at once went on board, found the lower deck crowded with people, saw one man armed with a shotgun apparently on guard at the gangway. I asked what was the trouble and was informed that they intended to land the cargo. Going aft, I found a party at work. They had the main hatch off and were passing up goods. I asked them to stop for a few moments, as I wished to know what they were doing. They

stopped at once, and one, who stated he was chairman, said they proposed to take so much of the cargo of provisions as they needed to supply their immediate wants.

He also stated that the transportation companies had failed during the past season to land supplies here, so that at the present time there was little or nothing in the storehouses; and as there was no prospect of another steamer arriving this fall they considered their action justifiable, not only to enable them to work their mines, but to save themselves from starvation; that there were 180 people here and in the Birch Creek mines who must draw their supplies from this place. I heard the captain of the boat (Dixon) protest against their action; neither party appealed to me. I called their attention to the unlawfulness of their acts. They replied, "There is no law or any person in authority to whom we can appeal." He went on to say that they had appealed to the superintendents and agents of both companies, and the only answer they could get was that no stores would be landed here. They informed me that two days before the steamer *Weare* was held up here and about 30 tons of provisions landed from her. I spoke to them of the desperate condition of affairs existing at Dawson; urged them to take no more than was necessary and let the balance go on. This they consented to do. They then asked the agent of the company to open the company storehouse and check in all stores landed by the committee, and that no part of such stores should be removed without payment therefor in cash at the company's own price.

At my request they cleared the boat of all stragglers and posted guards to prevent pilfering, and went on with their work. They completed their work by 2 p. m. I found that they had reduced the amount about 30 per cent from what they had originally intended to take. The boat was guarded until she sailed the next morning. I inclose sworn statement of stores taken, and I saw them placed in the company's warehouse. The second meeting was held the day after my arrival on my return. During the afternoon of the 1st instant and the morning of the 2d, I heard great dissatisfaction expressed on all sides at the failure of the master of the *Weare* to proceed on the voyage to Fort Yukon, as fully 50 people on board of her, belonging in Dawson, had come down as a volunteer crew at the request of Mr. Healey, the manager, to handle her for the round trip, so they could obtain supplies for the winter then. In their anxiety to get back they soon became aggressive in their demands, and a meeting was called. I stopped in for a few moments, saw several very much under the influence of liquor, heard much wild talk about taking possession of the boat, looting stores, etc. As there was quite a number of people in town not in sympathy with violence that I could rely upon, I secured all the arms and ammunition I could and quietly prepared to defend the stores. The committee waited upon the master of the *Weare* and he promised that he would get under way in the morning if possible. I inclose a copy of resolutions served upon him. The next morning the ice was solid around the steamer and she could not be moved. She must remain where she now lies for the winter.

Provisions on the steamer were exhausted on the 3d and the volunteer crew were ordered ashore without food or shelter. They appealed to me. I took them before the agent of the company, who, after hearing their case, admitted that the company was responsible; that he would furnish them shelter and food until such time as the river should become passable and they could reach Fort Yukon. The whole matter has been much aggravated by the drunkenness and inefficiency of the master mariner of the *Weare*.

Great injury will result to the commercial interests along this great highway if some radical steps are not taken to protect all persons from such interference with their legitimate business. At the same time there should be some power to force common carriers to transport goods for any person offering. At the present time neither of the transportation companies will transport a pound of freight for other traders or private parties, forcing all people coming into the Territory to be wholly dependent upon their stores for supplies at their prices. A large majority of the people now here are peaceable and law abiding, but in the absence of any person in authority to appeal to for the settlement of the many differences that are constantly arising, they are compelled to act outside of the law, and when influenced by passion, prejudice, or liquor, will commit acts that jeopardize great financial interests, and from which there can be no appeal.

While here I am constantly being appealed to to act where I have no authority. I can only act as an arbitrator or mediator in the cause of peace. The appeal continues to come to me to know when, if ever, the Government is going to send in officials to enforce the law. Miners complain that they can not perfect any title to their mines, owing to the absence of any land office. The departments are sending out commissions to commissioners, receivers, and registers who can not qualify for obvious reasons; the principal one is that there is not an official qualified to administer an oath within a thousand miles of this place. A commissioner is powerless, as he has no power to enforce his decisions.

I am only surprised that matters are not worse. "We are facing a fact, not a theory," as I believe it is the first time in the history of our Government that it has been called upon to govern an outlying province where the issues are vital and important, both national and financial, for if the transportation companies can not be given protection along this river they will be driven from the field, and a route opened up through British North America to supply our own people in our own country.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

Manifest of stores taken by committee of miners from steamer Bella, Alaska Commercial Company, at Circle City, Alaska, September 25, 1897.

	Pounds.		Pounds.
Potatoes, evaporated	5,000	Coffee	100
Butter	5,550	Flour	19,700
Lard	3,060	Beans	1,995
16 bales mill stuff	1,600	Plums	25
Baking powder	300	Nectarines	25
Bacon	7,920		
Hams	4,500	Total	49,775

Edwin F. Ball, purser steamer *Bella*, being duly sworn, deposeth and says that the foregoing is a correct and true statement of all the stores taken from the steamer *Bella* by the committee of miners at Circle City, Alaska, on the date above stated.

EDWIN F. BALL, *Purser Steamer Bella.*

Sworn and subscribed to before me this 27th day of September, 1897.

P. H. RAY, *Captain, Eighth Infantry.*

List of merchandise taken from the steamer Portus B. Weare, by the miners of Circle City, Alaska, September 28, 1897.

71 sacks beans, about 40 pounds each.
35 cases bacon, about 100 pounds each.
900 pounds lard.
810 pounds corn meal.
84 dozen cans condensed milk.
16 dozen cans clams.
48 pounds corn starch.
72 pounds egg food.
950 pounds butter.
36 pounds baking powder.
1 dozen 16-ounce bottles extract vanilla.
125 pounds dried pease.
15 dozen 2½-pound cans apricots.
2 dozen 2½-pound cans egg plums.
24 dozen 2½-pound cans peaches.
4 dozen 2½-pound cans pears.
78 dozen 2-pound cans corn.
8 dozen 3-pound cans sweet potatoes.
2 dozen 3-pound cans tomatoes.
14 dozen 2-pound cans pig feet.
40 dozen 2-pound cans corned beef.
12 dozen 2-pound cans lunch.
4 dozen 2-pound cans roast.
12 dozen 2-pound cans lunch tongue.
16 dozen 3-pound cans pork sausage.
25 dozens evaporated apples.
350 pounds dried nectarines.
280 pounds raisins.
225 pounds dried peaches.
375 pounds dried prunes.
2 dozen half-gallon cans honey.

J. E. CRANE.

NOTICE.

A miners' meeting will be held at 2 p. m. this afternoon aboard the *P. B. Weare.*
By order of the

COMMITTEE.

OCTOBER 1, 1897.

Called to discuss the proposal to force the *Weare* to sail to Fort Yukon.

P. H. R.

CIRCLE CITY, ALASKA, *October 2, 1897.*

Whereas, on the 29th day of September, 1897, the North American Trading and Transportation Company, by its general manager, selected and obtained the services of undersigned for the purpose of assisting in the transporting the steamer *P. B. Weare* to Fort Yukon, Alaska, for the purpose of obtaining a load of provisions and returning with said steamer to Dawson City; and

Whereas the officers in charge of said boat have, in our opinion and in the opinion of old river men, failed to use their best endeavors to accomplish said trip; and

Whereas in consequence of said failure on the part of the executive officers of said steamer we are stranded in Circle City without sufficient provisions to sustain us until such time as we can reach a point where such provisions may be had: Therefore, be it

Resolved by the undersigned, That unless said executive officers of said boat supply her with sufficient provisions and use their best endeavors to make the trip to Fort Yukon, that we as a body compel them to furnish said provisions and that we take charge of said boat and provisions and proceed to Fort Yukon.

Be it further resolved, That in case it becomes necessary for us as a body to take possession of said steamer, competent officers shall be placed in charge, and that every effort will be made to protect property of said company.

J. D. COPPERSMITH, *Chairman.*
B. FRANK PATTON.
M. S. EADS.
WM. WILLIAMSON.
WILL. J. LESLIE, *Secretary.*

A true copy.

P. H. RAY,
Captain, Eighth Infantry.

CIRCLE CITY, ALASKA, *October 7, 1897.*

SIR: I have the honor to submit for the information of the Department such facts as have come to my knowledge relative to the means of transportation for both passengers and freight now in existence in this Territory, how far present methods and equipment have succeeded in meeting the requirements of the country, and to what extent the companies now operating here are prepared to meet the demands that are likely to be made upon them in the immediate future.

Judging by the promises made to passengers by transportation companies operating here and several individual enterprises, both in San Francisco and Seattle, the results of the past season appear to have been, to say the least, disastrous, both to the companies and the industries of the country. Of 848 people who have been landed at St. Michael up to the time I left there, destined for Circle City and above, 42 have reached their destinations; the balance are stranded between here and St. Michael, or have returned to the States, and navigation is closed. There have been less than 2,000 tons of freight, all told, delivered above Fort Yukon, and there are now lying at that point 500 tons of provisions and liquor, cached by the steamers that could not get over the flats. This failure on the part of the transportation companies to put into the mining districts a sufficient supply of food has not only given a serious check to the mining interest and caused great suffering, but has destroyed all confidence among the people here in their ability to supply the demand by this route, The people here are now afraid that the failure of the river route for freight will cause the construction of a railroad through British North America to the Yukon River above the boundary, and that the mining districts of Alaska will be dependent for supplies on a route through a foreign country with all that means in the way of discrimination in favor of the British merchants.

From what I have witnessed during the past two months I am fully satisfied that the failure to supply the upper country during the past season via the Yukon River is not due to any natural obstacles that can not be overcome by boats suitably constructed for this river and

manned by efficient men. The boats now in the service of both companies are without exception unsuited for the work on the upper river, especially in navigating the upper flats.

They draw too much water for their tonnage, and are not equipped with the necessary spars and machinery for working over the bars. From my experience on the Upper Missouri and the Colorado rivers, I am satisfied that boats can be constructed that will do the work on this river. I am also well satisfied that much more could be accomplished if the employees of the transportation companies devoted less time to personal traffic.

From what I have learned from mine owners and prospectors, I am fully satisfied that the greater part of the gold belt lies in our territory, along the ranges known as the Upper Ramparts; that along the Tananna, Manook Creek, Birch Creek, and the head of Forty Mile there are diggings that will pay from $10 to $20 per day per man now lying idle. They will not pay expenses at the present prices of food. I am satisfied that with adequate means of transportation and cheaper food this will develop into one of the greatest gold-producing regions in the world.

A railroad from the head of Cook Inlet or Prince William Sound to the mouth of the Tananna, from which point supplies could be delivered by light-draft steamers along all the navigable tributaries of the Yukon, will secure to our own people the commerce of this whole country. It would give a route to the open sea that could be operated all winter, and act as a check to the Canadian route. At the request of the citizens here, I most respectfully recommend that the Government make a preliminary survey of the route named.

Should I remain in the Territory I will give my best endeavors to promote the work.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *October 25, 1897.*

Capt. P. H. RAY, *Eighth Infantry, U. S. A.*

SIR: I have the honor to make the following report of affairs at this place during your absence, September 24 to this date.

About fifteen people were left after the departure of steamers *Bella* and *St. Michael.* Steamer *Victoria* passed up on the afternoon of the 24th. She had no passengers and most of her cargo had been unloaded at Fort Hamlin.

The weather continued cold, with light snow; floating ice appeared in the river on the morning of the 29th, and by October 5 covered the entire surface of the river with a moving mass. This condition, I foresaw, would prevent a return of the boats already overdue, so I proceeded without delay to have our storehouse and office put in repair and our stores properly housed for the winter.

On October 4 the passengers of the North American Trading and Transportation Company remaining here made a demand upon the agent of the company for food.

He made no request for assistance from me, but on their own presentation issued rations for sixty days, pending instructions from the manager up the river.

On October 8, and for several days thereafter, very little ice was on the river, indicating a jam above. This surmise was confirmed on the 10th by the arrival of two men who had left Circle City September 30 in an open boat for this place. They lost their boat and most of their outfit 12 miles below Circle City, to which place they could not return, being on the opposite side of the river. They made their way down to this point on foot, arriving in an almost starving condition.

Your note, sent by an Indian from the ice pack on the 13th, reached me about 1 p. m. on the 16th. He had made the trip in about three and one-half days, and reported trail very rough. I started a party under charge of Joseph Carroll, with one other white man, Frederick Gasch, and an Indian, with two dog teams, to your relief the next morning. On the 18th eight men

arrived from up the river. They appeared on the opposite side of the river and boats were sent over for them. They were very short of food, living for two days, they reported, on flour and water. On the 19th the remainder of the party, known as the extra crew of the *P. B. Weare*, about forty men, came in. Their condition upon arrival, after tramping through the snow for six days, the last three almost entirely without food, packing their scanty bedding, was such as to arouse my keenest sympathy.

I made such temporary provision for their shelter and comfort as I could, turning over one conical, hospital, and wall tents, and two stoves.

Upon hearing a statement of the treatment they had received at the hands of the company's agents in charge of the boat, and of your action in the matter at Circle City, I went to the agent here, Mr. Booge, and asked him if he was willing to supply rations to them for five days, or until such time as you should arrive. This he willingly agreed to, supplementing the issue later to seven days. This party exhibited throughout only a desire for reasonable and fair treatment. Other and smaller parties came in the same evening, and continued to arrive during the 20th and 21st. Many reported themselves destitute of money as well as food, and some had lost their blankets and the little clothing they had in the ice. On the 21st I found it necessary to begin making issues under some form to relieve the hunger and prevent attacks upon the stores.

The agents declined to make sales on credit. I found a majority of the needy ones willing to go to work provided a month's supply of provisions could be given them to start with. The companies agreed to take cord wood at the current rates, and I gave the necessary orders for provisions, the men signing a contract to cut wood, which was to be taken up when the wood should be delivered.

On receipt of your note of the 17th, I started out another Indian and dog sled (morning of 23d), with additional provisions for your party, fearing you might run short yourself through helping so many along the trail. The party from the *Weare* and others, as soon as they obtained provisions, began building cabins and making preparations for the winter, such being the situation upon your arrival this date.

Yours, very respectfully,

W. P. RICHARDSON,
First Lieutenant, Eighth Infantry, U. S. A.

Capt. P. H. RAY, *Eighth Infantry, U. S. A.*

FORT YUKON, ALASKA, *October 26, 1897.*

SIR: I have the honor to report that I remained at Circle City until the 12th instant. During that time I was called upon to act as mediator between the crew of the *Weare* (which I mentioned in my report on Miners' Meetings) and the North American Trading and Transportation Company. As supplies were getting very short at Circle City and many wished to go to Fort Yukon to secure an outfit for the winter, several meetings were held with a view to coercing the master of the *Weare* to proceed to Fort Yukon, should the river become clear of ice. Finally, on the 10th, the master (mariner) stated to them that if the boat was cut free of the shore ice and he deemed it safe, he would go.

One hundred men set to work at once to cut her out, and by night she was practically free; but when on the following morning the master had not given any orders to connect the engines, as he had promised me he would do, the crowd became angry and a movement was placed on foot to seize the steamer, put a volunteer master and crew on board of her, and proceed to Fort Yukon. The agents of both companies became alarmed and asked me to use my influence to save property and loss of life. I called them together, explained the situation to them; called attention to the fact that they could not remain at Circle City for want of food; that I would not tolerate violence or any attempt to seize the steamer; that the river was open and perfectly safe for small boats; that it was a run of only about fifteen hours; that the company would furnish the boats and provisions for four days, and it would be better for them to drop all controversy, accept the offer, get ready as soon as possible, and go. They all agreed to it without dissent. That afternoon the company furnished three boats with a capacity for 60 men and provisions for

four days. They were loaded and made ready, and at 8 a. m. the 12th I saw them off, the balance to follow as rapidly as possible.

Knowing the bitter feeling existing against the company, and fearing that the caches at Fort Yukon might be plundered, as I learned that quite a number of lawless characters from Dawson had passed down the river, I decided to get down there as soon as possible, and at 10 a. m. I embarked in a boat which had just arrived, containing 8 miners on their way to Fort Yukon. We intended to run all night, which should bring us to our destination the next morning. The weather was mild, with some snow; there was a little ice running, which thickened during the afternoon, but all went well until about 8.30 p. m., when I heard the distant roar of ice in motion, and an Indian we had taken on board called out that the river was freezing. We at once tried to check the boat and attempted to reach the shore, but it was too late; the boat was heavily clogged with ice and we could not hold her against the strong current, and in a few moments we were in the gorge, with the ice crowding down upon us. The party behaved with great coolness and courage; our steering oars were smashed, and we worked to keep her on an even keel, so she would not be forced under the ice. It was quite dark and we could not tell how far we were from shore. After about two hours the pack became solid above us, and the boat was forced upward and out of danger for the immediate present.

When daylight broke we found we were about midway in the main channel and one-half mile from the right bank, with a small island 400 yards to our right. We saw 5 boats in the pack, some of them crushed, and several men along the left bank, but too far away to be of any assistance to us. Fortunately the weather had cleared during the night, and the temperature fell to 0.5° F., and had solidified the surface of the pack, so that with care we were enabled to reach the island, to which point we packed our provisions and blankets, but upon crossing it I found that there was an open lead of water between us and the mainland, where there was a party in camp. I recognized the boats of the crew of the *Weare* that had left Circle City a few hours ahead of me, and reaching the gorge by daylight had avoided being caught in the pack. They had one boat free, and in answer to my hail came over and ferried us across. The gorge had been formed several days before I left Circle City and boats came dropping in every hour, so that by night on the 13th there were at least 150 people within 1 mile of where I landed. I estimated that we were about 65 miles from Fort Yukon and 25 from Circle City.

As soon as I landed I started the Indian Paul with a note to Lieutenant Richardson, informing him of my location, with orders to send up dogs as soon as the river was passable for sleds. A Mr. Buzzell, a member of our party, started to go with him, but returned to my camp at 10 o'clock that night, exhausted. He said the deep snow and fallen timber made the route most difficult; that the gorge had raised the water in the sloughs, rendering travel by the river impossible, causing them to make long detours through the forest, where there was no trail. The afternoon of the 13th a delegation, representing all the people in my vicinity, came to me and asked me to advise them what to do.

An inventory showed that they had not to exceed four days' rations for all. It was useless to think of returning to Circle City, as there were no provisions there. To remain where they were meant starvation, as they had barely enough to carry them to Fort Yukon. So I advised them to take their blankets and food and make every effort to reach the fort. They all cheerfully acquiesced and made preparations to get off, and 50 started early the next morning, followed by squads, so that by night on the 14th over 100 were on their way.

During the day several were rescued from the pack. There were many narrow escapes, but so far as I could learn no lives were lost at that point, though during the nights we frequently heard cries of distress; but the weather having grown warmer so softened the pack as to render it impassable; we could render them no asssistance. If any went down it will only be known to those who will miss them. As the only one in authority I was being appealed to every hour for advice and assistance, so I deemed it my duty to remain there as long as possible. Six of the party I was with came and volunteered to remain with me and share their rations. I found that by the closest economy we could hold out eight days. This was supplemented on the 19th by 50 pounds of flour given me by Mr. Howe and 40 pounds of bacon from Mr. Malloy, two prospectors

who generously came to my relief, and which enabled me to feed many who came to my camp. The head of the gorge moved slowly up the river, so that by the 20th those coming down were forced to land from 2 to 3 miles above my camp. I received reports that boats were coming down daily, and that no one was allowed to remain at Circle City who was destitute of food.

On the 21st Mr. Frederick Gasch, of the North American Trading and Transportation Company, and Mr. Joseph Carroll, of Fort Yukon, arrived at my camp. They had voluntarily come to my assistance with one Indian and two dog teams, which they had left 20 miles below, where they were stopped by open water. They were short of food, having divided their scant supply with the hungry men they met on the trail. They reported that the Indian Paul had reached Fort Yukon the fourth day after leaving my camp, and none of the miners had reached there when they left on the 17th, but that they met the advance 15 miles above. Some had missed the route and crossed the main channel, and could not reach the fort without making a long detour. They also reported much suffering all along the trail, many being from two to three days without food. During the night the weather cleared, the temperature falling below zero F., closing much of the open water, and the next morning I started with Messrs. Gasch and Carroll for Fort Yukon, hauling our blankets on a small hand sled.

Owing to the absence of any broken trail and the extreme roughness of the ice our progress was very slow and laborious. We made 10 miles and camped in a grove of spruce. At 10 o'clock that night we were aroused by the arrival of the Indian who had been left with the dogs. He had become alarmed at the long absence of the two white men and had come on with the dogs and one toboggan to look them up. His good judgment saved us much labor, as I had determined to cache our blankets and food. The next day we reached the camp where the Indian was left and arrived here at 1 p. m. the 25th. I found that about 150 people had arrived here, and there had been some threats of taking supplies by force, but Lieutenant Richardson's prompt and decided action had checked all turbulence, and by cooperating with the agents of both companies had arranged that all destitutes should be fed. Those willing to work were to be allowed to cut wood for the companies at $5 per cord, and when they had earned sufficient money they should pay for their supplies.

The sick and indigent should be fed without charge, and the bills for such issues to come to me, to be submitted for the action of Congress. This arrangement is now being carried out. I O. K. all orders for issues which the Government is to become responsible for and will submit the total amounts when the work is finished. Both agents have verbally asked me to take charge of the caches, which I have refused to do, for cogent reasons. I shall not force an issue, but shall defend the caches from all violence and pillage, as they contain the only provisions this side of Dawson, upon which many hundred people are dependent for existence for the next seven months. Should it come to fixing the amount each shall receive, I may then be compelled to take charge, as I find there are many lawless and turbulent characters here. I have gone over the stock and manifests of both companies and find that both have exaggerated the amount on hand here.

The people arriving here all agree in stating that the managers of both companies urged the people to come here, stating as an inducement that there were over 1,000 tons of provisions at this place, when, in fact, there are less than 300 tons, and that badly assorted for issue. With a ration of 3 pounds per day there can be fed at this place 900 people until the 1st of June, without tea or coffee. I may be placed in a position where I may be compelled to take possession of the caches to save them from pillage and to insure an equitable distribution. Whatever course I may be compelled to pursue, I trust that the President and Congress will sustain me in what I deem to be the only right course, situated as I am, in using my best endeavors to save American citizens from starvation and death.

Very respectfully,

P. H. RAY,
Captain, Eighth United States Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

A. C. STORE, *October 29.*

DEAR CAPTAIN: I explained to the committee here the concession made on the subject of woodcutting; also agreed that in view of the approaching cold, short days, and probable distance they might have to go before finding suitable wood for cutting, a somewhat more liberal allowance of supplies for the first issue would be made.

I returned to the cabin to find you just gone. A few minutes afterwards one of the committee came back for you, or for me in your absence, to come and state the conditions to the men in a body. I did so, but without success, so far as bringing them to reason was concerned.

They passed a resolution in my presence to the effect that the committee should submit by 10 o'clock to-morrow morning a list of what was needed to outfit each man till the 1st of next June; that the list should be presented to the agent here and a demand made upon him to furnish it, and, in case of refusal on his part, to take the necessary steps for procuring this supply by forcible means. I told them you would be here, probably. They informed me that no steps would be taken to-night.

I estimate the number present at the meeting 75 or 80—a hungry and desperate lot. Many of them doubtless have money, and I heard a number say they were ready to go to work, but no dissenting voice was heard to the above resolution. It may take several men to hold them in check, and when it is done apparently a permanent guard will be necessary, unless some agreement can be forced upon them.

I will try and keep things straight till you come or send some orders.

Yours, truly,

W. P. RICHARDSON.

PROCLAMATION.

Notice is hereby given that I have this day taken possession, in the name of the United States of America, of all provisions and stores in the cache of the North American Trading and Transportation Company at this place, for the purpose of securing supplies for destitute citizens of the United States in north Alaska, and to secure such for lawful purposes.

Given under my hand this 29th day of October, in the year of our Lord one thousand eight hundred and ninety-seven.

P. H. RAY,
Captain, Eighth Infantry.

PROCLAMATION.

Notice is hereby given that I have this day taken possession, in the name of the United States of America, of all stores, provisions, and property contained in the cache of the Alaska Commercial Company at this place, for the purpose of securing from starvation destitute citizens of the United States in north Alaska.

All persons are hereby warned against trespassing on any Government property now under my charge.

Given under my hand at Fort Yukon, Alaska, this 29th day of October, in the year of our Lord eighteen hundred and ninety-seven.

P. H. RAY,
Captain, Eighth United States Infantry.

FORT YUKON, ALASKA,
October 30, 1897—8 p. m.

SIR: In connection with the attempt to take possession of the cache of provisions belonging to the Alaska Commercial Company this date, I have the honor to report that your note of instructions, with copy of proclamation taking possession of the supplies there, reached me about 12 o'clock last night. The proclamation was posted early this morning in a conspicuous place.

About 6.30 a. m. a man named Sheridan came to me with the information that the discontents were arming with the intention of heading you off, and any party you might bring from Fort Yukon. I sent him down to you with this information. About 7 o'clock a man named Noblett came to me and said the men wished to see me.

I told him I had no farther business with them or terms to make, and upon being pressed for the reason of this request, he stated that the men wished to take charge of me for my protection; that they intended to seize the cache and no force could stop them, but they did not wish to do me injury if it could be avoided. I told him to inform his followers that if they wished me they could come and get me. Immediately thereafter I sent a messenger to Fort Yukon with a note to you. This messenger they arrested and took from him the note, which, as you know, was never delivered.

There were four employees of the company and about half a dozen other men, most of the latter without arms, who agreed to stand by me in the defense of the cache in case it should be attacked. No attack was made, however, and your party, arriving about 10 o'clock, relieved the situation.

The intention evidently was to get possession of me and then seize the place; or, failing in that, to secure you, if possible, before you reached me, and then demand my surrender. The leaders in this movement were, so far as I could locate them, the man named Noblett, one calling himself Dr. Tack, but whose real name I am informed is Gates, E. Sanders, A. Mack, —— Jessen, A. Nelson, and Alex. Hart. The last-named man went from this place late last night with the information that you expected to go up this morning. All of the above-named carried rifles at the time of your arrival. I should estimate the number armed at 35 or 40.

In my judgment, based upon what I observed this morning and the character of the resolutions and remarks made in my presence last evening, this movement was no more nor less than a deliberately planned attempt to rob the store for booty, as many of the men had money, but refused to buy food, and all refused to work, although it was offered them on liberal terms.

Yours, very respectfully,

W. P. RICHARDSON,
First Lieutenant, Eighth Infantry.

Capt. P. H. RAY,
Eighth Infantry, United States Army.

NORTH AMERICAN TRANSPORTATION AND TRADING COMPANY,
Dawson, N W. T., December 18, 1897.

DEAR SIR: Inclosed find copy of letter from Capt. P. H. Ray, Eighth United States Infantry, which explains itself. We deem the situation so grave that we have, on behalf of the Government, secured the services of Mr. E. H. Wells (a most reliable messenger) to bear Captain Ray's dispatches to Washington.

We have advanced for the Government $1,000 to pay Mr. Wells's expenses, he to look to the Department for compensation for his services to Washington and return. In behalf of the American miners on the American side of the Yukon Valley we appeal to the Government to send us the strong arm of the military for protection from Fort Get There, St. Michael Island, to the boundary line between Yukon, Alaska, and Yukon, Northwest Territory. Our Government should act at once, as there are many valuable mines on the Koyukuk, Tanana, Manook, Birch Creek, Seventy-Mile, American Creek, and all of that portion of Forty-Mile mines lying within the American possessions.

The mining industries of the American portion of the Yukon Valley will be seriously crippled, if not entirely paralyzed, by reason of it not being safe to run steamers and land supplies at any of the mining camps along the river.

The great rush of the people to the Yukon makes it probable that armed raiders will hold up the steamers and loot the stores of their supplies, consequently the merchants and transpor-

tation companies will be obliged to confine their business to the Canadian side of the Yukon Valley, as the Northwest mounted police offer protection to life and property.

The many law-abiding American citizens who are engaged in exploring and prospecting the great mineral ranges of Alaska will hail with pleasure the presence of the military and the rigid enforcement of martial law until such time as we can organize into settled and permanent communities, so that we can protect ourselves as has been done in other Territories.

The shifting population of the Yukon precludes the doing of this, and unless prompt aid is given we are afraid that one of the finest mineral ranges on earth will revert into its primitive condition.

Truly, yours,

N. A. T. AND T. Co.,
By ELY E. WEARE, *President.*
By JOHN J. HEALY, *Manager.*

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *October 30, 1897.*

MY DEAR SIR: I send Mr. Gasch with dispatches, and he will explain the situation here more fully than I can write. I hope that Captain Hanson and yourself will take immediate steps to check the exodus down the river as far as possible. There seems to be some misunderstanding in regard to the amount of subsistence stores in the two caches at this point. Miners state that they were informed by Captain Hanson and yourself that the two companies had over 1,000 tons, but I find in fact that there is less than 300 tons in the aggregate in both caches. This will feed about 1,000 men until June 1. There are over 300 people now here. Circle City is very short, and I am reliably informed that there are over 500 people coming this way between Dawson and this place. Of course I will push as many on to Fort Hamlin as possible. It is also possible that the caches here may be destroyed.

Yesterday it came to my knowledge that between 75 and 100 men calling themselves miners had organized an attack on the A. C. Company cache. I went at once with Lieutenant Richardson, and a committee called upon me and stated that yourself and Captain Hanson had promised at Dawson that they should be allowed to purchase supplies here on credit, and they demanded a year's outfit be furnished them. If this was not done before 10 o'clock the next day they would take it by force. As Mr. Davis did not feel that he could comply with their request, he refused. I explained to them that I would issue rations to all destitute, and they went away. Lieutenant Richardson went over to their camp and they passed a resolution in his presence to attack the cache the next morning. Word was sent down to me. I at once posted a proclamation taking charge of both caches in the name of the United States, and the next morning I went over with about 25 men, unarmed. When within one-half mile of the cache I was met by one man, who said he was delegated to have me come into their camp for consultation, which I refused to do. He then came out in his true colors and said he would not allow me to go to the cache.

As I did not stop, he then asked me if I would wait where I was until they could consult, saying they had the cache. As I knew that Lieutenant Richardson was in the building and there had been no firing, I was convinced that he was lying. I told him again that the stores were the property of the United States; that I would feed the destitute, give bona fide prospectors sufficient on their notes to go out, and defied them to fire or touch the cache. He went to the camp and returned in about twenty minutes with word that they accepted my terms. I found Lieutenant Richardson in full possession, and no attempt had been made to force the guard, though they had tried to get Lieutenant Richardson into their camp with a view of holding him as a hostage in event I should attack them. As matters stand now, I am feeding all destitute on their oath that they are such; all those having money must pay for what they get; no man shall be allowed to purchase more than $150 worth for an outfit for the balance of the year, and leave

the place at once; all stores issued on my orders to be charged to the United States, your employees and business to go on as usual. I believe the caches are now safe so long as I am in charge. This was not a case of starving men, but a clear one of premeditated robbery. If you wish to preserve your property, use your influence to have the necessary legislation so troops, when they arrive next spring, can act promptly and unhampered. I urge immediate action through your friends in the States.

I have advised Captain Hanson that I have written you. Will you please show him this letter? And you are at liberty to use the information as you see fit for the public good.

Very truly, yours, in haste,

P. H. RAY,
Captain, Eighth United States Infantry.

Capt. J. J. HEALY,
Dawson, Northwest Territory.

FORT YUKON, *October 30, 1897.*

DEAR SIR: Having been waited upon by a committee representing, they claim, some seventy men, and demanded in their behalf provisions to be delivered to each man for seven months, or, in failure to do the same they are organized to use forceful measures to obtain their demands. Being unable to protect the interests of the Alaska Commercial Company with what few men I have at my disposal, I now ask you, as a representative of the United States Government, for protection.

Yours, very truly,

ALASKA COMMERCIAL COMPANY,
By H. W. DAVIS, *Agent.*

Capt. P. H. RAY.

FORT YUKON, ALASKA, *November 1, 1897.*

SIR: I have the honor to inclose herewith letter of Mr. Ely Weare relative to holding up the steamer *Weare* at Circle City. I am not prepared now to discuss the differences between the citizens of Circle City and the transportation companies. But I can say of my own knowledge that consignment of stores to any one place on the manifests of the steamers means nothing, as I saw landed at Manook stores consigned to Dawson and Circle City, and I also know by personal investigation that if the stores had not been taken from the *Weare* and *Bella* there would have been suffering from want of food, and that the miners at Circle City allowed, at my request, a part of the stores taken from the steamers to be used to feed destitutes.

It must be remembered that the steamship companies are the traders, and all consignments are to themselves in the name of the stores.

They will not forward stores by their steamers for any outside parties. The citizens at Circle City were at the mercy of the companies, and I inspected the warehouses and saw that they did not contain sufficient supplies to last thirty days. The feature that was most prominent when the *Bella* was held up was the cheerfulness and alacrity with which all the employees of the company, from the agent down, facilitated the work of the miners, and their expressions of approval.

The statement of the stores taken from the *Weare* I forwarded with my report from Circle City.

Yours, very respectfully,

P. H. RAY,
Captain, Eighth Infantry, United States Army.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

NORTH AMERICAN TRANSPORTATION AND TRADING COMPANY,
Steamer Portus B. Weare, September 22, 1897.

MY DEAR SIR: I think now it would have been better if I had unloaded more of my cargo and taken on your outfit and brought it to Circle City. We arrived here on the morning of September 21, and were met by a committee of four men after holding a miners' meeting. The names of the committee were: A. Conners, George Herrington, Henry Lewis, Michael Lyons, S. Poot. Henry Lewis was chairman of the meeting; S. Poot was secretary. The committee demanded us to unload our boat at this post and return to Fort Yukon and bring up as much of the cache as we could. They stood guard over us with guns all night, and when the committee waited on me on board the boat there was an armed force on the shore.

I have unloaded part of my load and expect to put flour in place of it and proceed to Fort Yukon and Dawson, where the people are in great need of the food. They started to unload the boat last night, but I told them I wanted further time to consider the matter. This morning I am unloading about one-third of my cargo, and have not touched the bonded goods, with the exception of a few cans of tomatoes.

This is the condition of affairs, and there will be more of it before the winter is over. There are a lot of hungry men here, and they are firm, and if I can not get away from here without unloading my cargo the customs department should not hold us too firm on our bond. We certainly do not wish to do anything but what is right. I wish you would make a note of this matter in your report to the Government. These are facts that can not be got around. My only regret is I did not bring you through. Hope that you will be able to come on the *Bella*, if she gets through.

I remain, very truly, yours,

N. A. T. AND T. CO.,
By ELY E. WEARE, *President.*

Captain RAY, U. S. A.,
Fort Yukon, Alaska.

FORT YUKON, ALASKA, *November 1, 1897.*

SIR: I have the honor to report that since my return matters here have assumed a very serious aspect. The crew of the *Weare* and others caught in the gorge at the same time as myself are in camp here at the site of the old fort; 4 miles above the Alaska Commercial Company have a cache of about 200 tons of stores, landed there last fall when their steamers failed to pass the bar.

The North American Trading and Transportation Company have a cache here. On the afternoon of the 29th ultimo I received a note from Mr. Davis, agent of the Alaska Commercial Company, saying that he was informed that there was a movement on foot to seize the cache, and a meeting was being held for that purpose.

I went up at once with Mr. Richardson, and soon after arriving there was waited upon by a committee from a miners' meeting, who stated their demands: That there were 75 of them, and they demanded they be furnished on credit with an "outfit of provisions and clothing for nine months." This Mr. Davis, the agent, declined to do.

I explained to them that I would give orders on the stores for food to feed the destitute, but as the companies offered work at good wages the able-bodied should accept it, and those having money would be allowed to purchase a reasonable outfit of provisions for the balance of the year. I came away without getting any definite answer out of them, leaving Lieutenant Richardson at the cache for the night. I received a note from him saying he believed they intended to attack the cache at 10 a. m. the next day. I at once issued a notice, taking possession of the cache (copy inclosed), and had them posted that night on the door of the storehouse and in all the camps, and early next morning started from here with 25 men (volunteers).

I could not arm them efficiently, being able to raise only five rifles and a few pistols, so I deemed it wise not to take anything but pistols, concealed.

Soon after starting word came to me that they had passed a resolution to arrest me should

I attempt to go to the cache. When I arrived within one-half mile of the cache I was met by one man (Noblett) who stated the miners wished to have me come to their camp to talk over the situation, which I declined to do. He then came out in his true colors, and said they had determined to prevent my going forward by force, and at a signal from him 22 men armed with rifles came out of the timber and covered the party.

Noblett said they had possession of the cache. As Lieutenant Richardson was there and I had not heard any firing, I knew his statement was false, and said so, at the same time starting on, and told them they might open the fight if they wished to. He then said that as conditions were changed by my seizure of the stores, and they were loath to disturb Government property, that if I would wait a few moments he would consult with the committee, and asked if I was still willing to feed the destitute. I stated my terms to feed the destitute, and so long as the companies would take wood they were to go to work at the rate of $5 per cord, and if they could not get work they would be fed, if possible, until the river opened; that bona fide miners could obtain outfits provided they went in the field at once.

In a few moments he (Noblett) returned and said they accepted the terms, and I went onto the cache where I found between thirty and forty men who said they had nothing, and I caused all to be fed. I have hoisted a flag over the buildings and placed a guard.

This is not a case of worthy destitute miners; it is premeditated robbery, and had they been able to get possession of either Lieutenant Richardson or myself the cache would have been lost. A number of very desperate and lawless characters have been forced out of Dawson, Northwest Territory. There is quite a number in the camp near the cache, and I learned to-day that they have been quietly securing arms ever since their arrival here and mean mischief.

I am securing all the arms and ammunition I can. Shall move with caution, and get matters in such shape as to hold the balance of power.

I am compelled to take the responsibility to protect life and property and to save as many lives as possible in the emergency.

I only hope the President and Congress will sustain my action and treat me with charity should I be found in error. I believe my experience confirms my opinion formed on my journey in here, that some radical steps are necessary to give protection to life and property next summer with the opening of navigation.

I am still of the opinion that it should be a military government, with power to hunt to the death the lawless element.

Yours, very respectfully,

P. H. RAY,
Captain, Eighth Infantry, United States Army.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *November 2, 1897.*

SIR: I have the honor to recommend that the Government take steps to effectually check emigration to this region of all people who do not come prepared with sufficient provisions to last them two years.

My reasons for suggesting such action are based on my own observation and experience of the suffering from hunger and exposure that I have personally witnessed among hundreds of people, and the fact that next spring thousands of people, ignorant of the conditions existing in this country, will attempt to come in without adequate means of subsistence, as they have done this year. The utter hopelessness of any large number of people being able to earn enough to sustain life in this country (even if provisions could be obtained at any price) is shown by a plain statement of the facts.

First. There has not been a single discovery of a new placer district either in Alaska or British North America in the last eight months. At present claims of any value in the Klondike district are taken up, and work there is limited owing to the scarcity of provisions and illuminating supplies.

Second. There is no employment for any large number of people in any capacity whatsoever; all values are speculative, and there is no fixed standard for labor.

Third. There is not now in existence, or likely to be within twelve months, any adequate or efficient means of supplying the people now in Alaska and Northwest Territory.

Fourth. From reliable information I am fully satisfied that not 7 per cent of all the people who have entered this country during the past year have earned their living up to the present time, and hundreds are scattered along the river destitute of food, clothing, and money.

The great majority of the people coming into this country have not the faintest conception of what they are going to do to earn a living upon their arrival here, as, after expending what little money they bring with them, they become dazed at finding themselves where there are no industries and no possible means of earning a living or finding gold by their own efforts; and their condition is pitiable when, as winter shuts down, they find themselves cut off from the world, starvation staring them in the face, and no possible hope of getting out or communicating with the outer world.

From all I can learn, the rush to this country will be very great next year, and any step that will prevent people from coming here in their ignorance will be an act of charity.

Yours, very respectfully,

P. H. RAY,
Captain, Eighth Infantry, United States Army.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *November 3, 1897.*

SIR: As arrangements for a regular mail can not be depended upon, and as I believe the conditions here should be known to the Department and the President, I to-day dispatch a special courier to go through to Juneau, if possible.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *November 3, 1897.*

SIR: In view of recent developments and the knowledge that the lawless are banding together along the river for the purpose of robbery, I have again to respectfully renew my suggestion of the Government placing on the river a small light-draft steamer with high power, armed and used to patrol the river and place detachments as the movements of the people demand.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *November 15, 1897.*

SIR: Since submitting my last report on routes of transportation in this Territory, I have been able to obtain some information relative to the route from Cook Inlet to the Tanana, which I have the honor to respectfully submit. From reliable prospectors who have been over a part of this route I learn that there is a practicable route from the head of Cook Inlet up the Sushitna; that the right or west fork of that stream breaks through the Alaskan Range by a

low pass, and that the Indians from the Tanana travel this route in the winter to barter with a trader located at the mouth of the Sushitna. From Circle City to the Tanana via the head of Birch Creek is, I am informed by miners who have been over the trail repeatedly, 125 miles. The Indians say that it takes them from fifteen to seventeen days to make the trip from the Tanana to the store at the mouth of the Sushitna, which, at their rate of travel, would make the distance to be about 340 miles by trail, making the total distance from Cook Inlet to Circle City, 445 miles.

I notice that by latitude and longitude it is less than 400 miles. The advantages of this route over that of Juneau and Dyea is apparent, as the distance from Circle City to Juneau is estimated at 1,040 miles, and the route impracticable for winter travel, and mostly through a foreign country. The exodus this winter from the Klondike has brought into Alaska many experienced prospectors. From them I have been enabled to obtain much reliable information relative to the resources of the country. They all agree that from Cook Inlet to the boundary they have found gold in varying quantities in nearly every stream and gulch prospected, but that owing to the high price of provisions they could not afford to pay any attention to any localities that paid less than one ounce to the man per day. The development of the true mineral resources of the Territory will be in exact proportion to the cheapness of the food supply. At present the trader and laborer are bidding against each other for the gold the miner gets or hopes to get, and their prices are not governed by any law except the miners' necessities, consequently the price of food is so manipulated as to take about the output of the country, be it more or less. This is rendered possible only by the fact that every pound of food brought into the country by the cheapest route is controlled absolutely by two commercial companies; the goods brought in by the pass only serve to fix a maximum. This policy keeps the country in a chronic condition of semifamine, and to it is due the fictitious price prevailing in the country, both in food and labor.

The experience of the past summer has fully convinced me that the Yukon River route, as now managed, will be unable to supply the people now along the upper river, even at the present exorbitant rates, so that the whole future of the Territory is dependent upon some route being opened up to the open sea; one that can be operated throughout the year, so as to give stability and permanency to all enterprises looking to the development of the interior of the Territory. A careful study of the situation convinces me that the route I have named is the most practicable and offers more advantages than any other, as it lies entirely in the gold belt, where some valuable mines are already located.

In view of the wasted energy and distress I have witnessed, I again most respectfully recommend that an officer of the Engineer Corps be detailed to make a preliminary survey of this route, and at the same time the possibilities of a terminal on Prince Williams Sound be looked into. I would respectfully suggest that if undertaken the expedition should be dispatched so as to be enabled to leave the seacoast not later than April 1, or before the ice breaks up in the interior, so that the journey may be made with dogs; that it proceed up the Sushitna to the junction of the right or west fork of that river, up that to its head, thence across the divide and down the most available tributary of the Tanana, and down that stream to the Yukon, where I could meet him when the river opens, should the Department so desire. A careful survey of the left bank of the Tanana from the point where the expedition may strike it to the Yukon should be made.

Very respectfully,

P. H. Ray,
Captain, Eighth Infantry.

Adjutant-General United States Army,
Washington, D. C.

FORT YUKON, ALASKA, *November 15, 1897.*

SIR: I have the honor to report that affairs here remain unchanged since the affair of the 30th ultimo, upon which I have reported. Ostensibly I am in charge of the caches, but in fact the business of the companies is unchanged and they are conducting their own affairs. In feeding the destitute I have each case carefully investigated, and where they are without money or provisions I give assistance in orders for provisions on the stores, keeping as near the ration allowed the Army as possible. This assistance is to cease as soon as they have provided themselves with shelter.

All able-bodied who remain here must accept such employment as the companies offer in cutting wood, for which they are to receive $5 per cord in food or money. There are over 150 such men now at work and by the end of the month they will be self-supporting. To those who wish to go prospecting here in Alaska and are destitute, but have sleds and clothing to take the field, I am supplying to June 1, 1898, for which they give their notes, payable at Circle City on or before November 1, 1898. This class claim that they do not want to be classed as destitute; that they are willing to pay as soon as they can hear from the States or get back to Dawson, where they have property. Some of these, of course, will not pay, and my understanding with the companies is that they will be reimbursed by the Government for all delinquents. About 100 have been supplied and sent out in this manner.

I deemed this the best course, because there is no other source from which they can be supplied; consequently they must be fed here, and it would be unsafe for them to remain here in idleness, as all could not be employed in cutting wood for want of proper tools, and much benefit to the country may be derived from their prospecting. I have forced the malcontents away from this vicinity and do not anticipate any farther trouble, as the most reckless have high regard for everything that represents Federal authority. Over 300 have received assistance up to date, and about 150 who had sufficient money to pay for their supplies have purchased their outfits and gone away. Quite a number of the latter class were implicated in the attempt to capture the cache. The sick, indigent, and those without sufficient clothing to protect them while at work, I am feeding here, making them put up cabins to protect themselves during the winter. There were but few blankets and but very little clothing in the caches, and that is now entirely exhausted. Some have lost their clothing in the ice jam, others have wasted or sold it, while many in their improvidence came into the country destitute of any such provision for the winter. They are coming in daily from Dawson, and I learn from men coming over the trail that there are about 150 now on the road for this place.

There is now here a party of 7 men belonging to the Dominion land survey service. They were obliged to come here for supplies, have put up cabins, and will remain until the river opens, when they expect to return to Northwest Territory.

The agents of both companies have commenced forwarding by dog teams such supplies as can be spared from this place to Circle City and Dawson. It takes from twenty-five to thirty days to make the trip to Dawson, and the load is 200 pounds per dog. The amount forwarded in this manner will not be of any importance in the general result, as the prices will not admit of their being purchased by any but those with very ample means. The regular rate for freight from here to Dawson is $1.25 per pound, so the prices there range about as follows: Flour, $150 per hundredweight; bacon, $200 per hundredweight; coffee, $250 per hundredweight, and everything else in proportion. Candles are $1 each, and freight on them $50 per box. The caches here are without coffee, tea, or candles; they have a little oil, but no lamps. With the loss of the sun this deprivation is severely felt, as there is no substitute to be obtained in this region.

Dogs are selling here at $150 to $300 each, and hard to get at that price. In my opinion, all those who are destitute and without employment in the spring should be forced to leave the country. They will only continue to be a burden to the Government and a menace to life and property.

Very respectfully, P. H. RAY, *Captain, Eighth Infantry.*

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *November 24, 1897.*

SIR: I have the honor to report that conditions here remain practically unchanged; over 300 people have received assistance. There are about 200 cutting wood and over 100 have gone prospecting. There are over 100 who have sufficient money to purchase their supplies for the winter, and are putting up cabins, intending to remain here until the sun returns before going out prospecting. The lawless element is quite strong and increases with arrivals from Dawson. The store of the North American Trading and Transportation Company was burglarized on the 19th instant and over $6,000 stolen, principally in gold dust. As yet no part of the money has been recovered, and the apathy displayed by the people in any effort to do so or to capture the thief is a fair standard by which to judge the character of a large number of the people arriving here daily. After what I have personally witnessed, I believe I am justified in saying that in this locality there is a large number of people who are not law-abiding, and the only civil officer in north Alaska (the United States commissioner) is openly spoken of with ridicule, being without power to enforce the writs of his court. Property is not safe and must be constantly guarded. I hear constant complaints of caches and cabins being robbed, and Mr. Charles Smith, United States collector of customs at Circle City, reports the same condition of affairs existing up there.

I am more fully convinced than ever that the ordinary machinery of civil government for a Territory will be totally inadequate to cope with the condition of affairs now existing here, or that will arise with the opening of navigation. Of course I am powerless to act, and without troops it would be useless for me to attempt to act, even if I had the authority, for the lawless element has become so strong that in my opinion it would be extremely difficult to obtain a posse comitatus to enforce a civil writ. The old miners and prospectors greatly deplore the existing conditions and claim that the lawless came with the influx of the past summer. I am reliably informed by all the better class of miners from Dawson that the authorities there have as far as possible forced the criminal and dissolute classes down the river and across the border. The fact that with the migration this element seems to preponderate goes far to confirm this report, though it may have been necessity that forced them out, and not directly the action of the officers.

I am not taking any action except to advise and encourage the law-abiding, and shall not depart from such policy unless life and property should be again threatened by mob violence, when I shall act on the defensive, with such citizens as will assist me. But one man has arrived here from Manook. He reports that there are about 500 people there with plenty of provisions. As yet no one has arrived here from Dawson who left there after the river closed at that point, so I am without definite information as to the probable number of people to arrive from there. The mails are uncertain and unreliable. I have not received any communications from Washington since sailing from Seattle.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

[Telegram.]

PORTLAND, OREG., *November 29, 1897.*

Hon. WILLIAM MCKINLEY,
President of the United States, Washington, D. C.:

Overwhelming evidence testifying to the grave danger which confronts the American miners on the Yukon and its tributaries with the dreaded horrors of starvation when the present small stock of provisions shall be exhausted, demands of us, as humane people blessed with abundance, that everything in our power shall be done to relieve the distress which is almost a certainty unless supplies of food can be transported to the imprisoned miners. With this object in view, the Portland Chamber of Commerce has communicated with kindred organizations on the Pacific coast and has obtained in almost every instance assurances of hearty cooperation in

furnishing the necessary supplies so soon as the Government shall promise to transport the same to their destination and supervise their distribution. Private resources are wholly inadequate to the task involved. Out of our abundant storehouses the people of the Northwest tributary to Portland are capable of furnishing food supplies in quantity sufficient to provide against the impending distress, but lack the means necessary to transport the same; and to provide for this we appeal to the nation through its Chief Executive and its Representatives in Congress, to the end that an expedition under the management of officers of the Army or Navy be provided for and instructed to make all possible haste in the accomplishment of the mission intrusted to them. Assurances thus far received warrant us in guaranteeing to the Government that the people of the United States, and especially that portion immediately tributary to Portland, will supply all the food products which the Government will undertake to transport to the beleaguered miners, and we earnestly pray that your Excellencies will heed our petition and lend to it your valuable support.

With assurances of our most loyal consideration, we have the honor to subscribe ourselves,

Your most obedient servants,

THE PORTLAND CHAMBER OF COMMERCE,
By W. S. MASON, *President*,
D. D. OLIPHANT, *Secretary*.

[Telegram.]

TACOMA, WASH., *December 2, 1897.*

The PRESIDENT, *Washington, D. C.:*

I am convinced the difficulties in sending relief to Dawson City are greatly exaggerated. This company is building a railroad from Dyea to Dyea Canyon and an aerial tramway from Dyea Canyon over Chilkoot Pass to headwater of Yukon. Both of these will be completed by middle of January. This will overcome chief obstacle to getting supplies to Dawson. Any amount of supplies can be transported from there to Dawson in January or February, with dog or reindeer teams, in from twenty to twenty-five days. There are unquestionably enough provisions in Dawson to suffice until March 1. This company will be glad to cooperate with Government in transporting from tide water to Lake Lindeman sufficient provisions to avert threatened famine.

HUGH C. WALLACE,
President Chilkoot Railroad and Transport Company.

[Telegram.]

PORTLAND, OREG., *December 2, 1897.*

MY DEAR SIR: It has been most gratifying to the citizens of this great country that the President and yourself have enlisted in the cause of our threatened citizens in the far north, and that your responses to our efforts to obtain Government aid for the relief expedition which we prayed for have been prompt and full of encouragement. Situated as we are, at the terminus of one of the great Alaskan lines of steamers, and having many of our fellow-citizens in all the northern ports, our facilities for obtaining reliable reports as to the condition of the people on the banks of the Yukon could not be surpassed, and we foresaw the terrible condition of affairs which has been made manifest to the world since the arrival of the handful of miners who have escaped from the icy prisons of the far North. Our people are united and thoroughly in earnest, and Portland has undertaken to gather the food products necessary for the relief of the destitute gold seekers at our wharves. We will assemble a store of food as great as the Government will transport, and the largest vessels which they may have at their disposal can be filled, if necessary, unless we totally misinterpret the spirit of the people of the Northwest. Inasmuch as Portland is the railroad center of the Northwest, and that the carriage of all donations to the relief com-

mittee from the surrounding country has been guaranteed, we desire that the point of departure of the relief expedition shall be from this city, and trust that so soon as you may be authorized to undertake the expedition prayed for you will promulgate orders to this effect.

With the utmost consideration and respect, we have the honor to subscribe ourselves,

Your most obedient servants,

THE KLONDIKE RELIEF COMMITTEE OF THE
PORTLAND CHAMBER OF COMMERCE,
By H. R. LEWIS, *Chairman;*
E. C. MASTEN, *Secretary.*

Approved.

W. S. MASON,
President of the Portland Chamber of Commerce.

Gen. R. A. ALGER,
Secretary of War, Washington, D. C.

FORT YUKON, ALASKA, *December 18, 1897.*

SIR: I have the honor to invite the attention of the Department to the deplorable condition of the mail service in this Territory. The regular mail contractor has brought but one mail (October 12) as far as Circle City this year, and has sent none out. There is no provision whatever for forwarding mail west of Circle City during the winter.

The postmaster for Circle City is somewhere in the States, his assistant has been put out of the office for drunkenness, and the office is now in charge of the agent of the American Commercial Company. The Department has failed to provide the office with any postage stamps. The mail that comes in by steamer via St. Michael is without any proper supervision. There are no route agents, and the officers of the companies pay little or no attention to it. Over 100 sacks were put ashore here when I landed, all Circle City and Dawson mail. I induced the captain of the steamer *Weare* to take a part of it. The captain of the steamer *Bella* refused to take any. After my return from Circle City I found lying in the snow, outside the cache, a second-class mail sack, which, upon opening, I found to contain several hundred letters addressed to Dawson, Northwest Territory. I shall try to get it sent forward the first thing in the spring. I recommend that the Post-Office Department place route agents on all steamers, both ocean and river, and that a route be made to include Fort Yukon, Rampart City (Manook), and Tananna Station in winter, either via Dyea or in our own territory (Cook Inlet), should that route be found practicable.

The present mail contractor is frozen in somewhere about the mouth of the Tananna, and it is to be regretted that contracts are awarded to men who do not understand the conditions existing up here. They seem financially and mentally incapable of fulfilling their obligations.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *December 20, 1897.*

SIR: I have the honor to report that the migration of people from Northwest Territory has about ceased. From parties direct from Dawson I learn that those who are without provisions to last them until the opening of navigation are going out by the way of Juneau. Supplies are being shipped up from here to Circle City to meet the shortage there. From my own knowledge of the conditions existing there and reliable information from Dawson City, I do not believe that there will be any loss of life from starvation among the whites.

The Indians along the Porcupine and Juan de Leur are starving. Advance couriers have come in begging that food be sent out, as the women and children are dying along the trail. I

have sent out food and shall do all I can to keep them from perishing. There are about 140, all told, in the two bands. They report that the caribou migration did not come their way and that the fish catch last fall was almost an entire failure. Nearly all their dogs have perished from the want of food, leaving them helpless. The civil authorities are not furnishing any protection to life and property from the boundary to the sea, and are powerless to do so with the meager machinery at their command.

There is a dangerous element gathered here that was forced out of Dawson, which shows some disposition to be troublesome; but I hope to be able to keep it under control. Should the Army be given any power to act next spring, I respectfully suggest that a small detachment of troops, under a discreet officer, be sent up the river by the first boat. It can be used to guard the first boats coming down the river with treasure, will have an excellent moral effect, and it is possible that I may be in need of assistance. I have sent full reports up to date.

Parties coming up the river report that there are three steamers wintering at the mouth of the Tanana, with over 100 people on board, and that there are about 400 people at Rampart City (Manook). There have not been any new discoveries of gold reported, either in Alaska or Northwest Territory. No dependence can be placed upon the regular mails for this country, either during the winter or next spring. I have not yet been able to obtain the dogs which I contracted for at the mouth of the river, so have been unable to visit the mines, but shall make every effort to do so before spring.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *December 27, 1897.*

SIR: I have the honor to report that there is a condition of affairs existing here that should, in my opinion, receive prompt attention. I have had occasion to notice from time to time a disposition on the part of people not particularly friendly to law and order to obtain arms and ammunition, while any effort on my part to make such a purchase through friends has been met with refusal. It is a fact that there is little or no game in the country, and until very recently rifles were considered of little or no value, and I have seen them thrown away along the trail.

A few days ago I learned from a friend at Manook that there was a movement on foot among the lawless element to organize for the purpose of holding up the boats coming up in the spring for food and to capture the first boats down the river from Dawson for the gold they might have on board. I believe now that some such movement is on foot, and to one who has witnessed the suffering, disappointment, and desperation of the people wintering along the river it creates no surprise.

There are over 1,200 people along the Yukon between the Tanana and the boundary at the present time. Over 50 per cent of these are without employment or any means of obtaining a livelihood, as witnessed by the destitutes coming here daily for food, and a very large per cent has left families in the States dependent upon it for support. The total absence of any form of government is beginning to be understood and is having its effect. The possible immunity from punishment adds to the temptation to sieze by violence that which they feel they have been denied by fate from obtaining by honest means.

As a necessary precaution, I respectfully suggest that a suitable guard be placed on the first river steamer clearing from St. Michael for the upper river and (should the Canadian government object to troops crossing the boundary) dropped at Mission Creek, there to await the return of the boat. From my own knowledge of these people I do not believe a civil posse could be obtained that would fire on any party attacking a boat.

They are all too much in sympathy with any measure that will "do up" the companies, who

unfortunately seem to have made many very bitter enemies in this country by various methods. Unless otherwise ordered, I shall follow the ice down to St. Michael and there await further instructions. I have confidentially advised the managers of both companies at Dawson.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *January 5, 1898.*

SIR: I have the honor to report that John Schuman's band of Porcupine Indians, from the lower Rampart House, numbering about 80 people—men, women, and children—arrived here on the 27th ultimo in a very destitute condition. With but few exceptions, they were without food and had been so for several days, as shown in their wasted forms and famine-stricken appearance. I am drawing on the companies here for sufficient flour, meat, and rice to keep them from starvation. Up to date I have furnished relief to 108 people (32 families), principally of the Juan de Leur and Porcupine bands. To a great extent they are the victims of the gold craze.

The old local trader here (Mr. Beaumont), who has heretofore supplied their wants, taking their peltries in exchange, was unable to have any stores delivered at this point last summer, as the mining interest assumed such magnitude as to practically obliterate the Indian trading interests, and no attention has been paid to supplying the natives with the necessaries, such as arms, ammunition, blankets, etc.; and even where the companies have any supplies such as the Indians require the prices are such as to practically render it impossible to support themselves by the chase, for the price of such goods has been advanced over 100 per cent.

The present outlook for these people is most serious. It is too far north to justify any attempt at agriculture. I do not know any domestic animals that can be introduced in time to meet their wants as a pastoral people, nor can I discover any local industry whereby they may become self-supporting.

I am opposed to the gratuitous issues as a step toward extermination through idleness. At present I am requiring them to cut wood, or go out hunting where they have ammunition; but as the stores at Circle City and this place did not receive any last season there is but little left of the old stock among the Indians.

The numbers that usually depend upon this place for their supplies are about as follows: Yukon band, 130 men, women, and children; Juan de Leur, 80 men, women, and children; Porcupine, 275 men, women, and children.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *January 5, 1898.*

SIR: I have the honor to report that the condition of affairs here remains unchanged. The people in this vicinity have ceased to be nervous in regard to the food supply, and all who are able have either gone prospecting or settled down cutting wood.

From private advices and newspapers of September 21, I notice that considerable anxiety existed in the States at that time relative to the possibility of a famine in this country and Northwest Territory. From reliable gentlemen just down from Dawson I am assured that there is no danger of starvation at that place, as there is sufficient food there to feed all remaining. Circle City is practically supplied, and they have ceased freighting up from here. The supply here is more than sufficient to meet all demands, including Indians. I have advices from all points in

this Territory where any considerable number of people are wintering, and I am positive there is no ground for alarm or anxiety, as there is sufficient food now in this country to feed all remaining here. There is no communication with St. Michael from this country during the winter or before June 15, but I know from actual observation that the supply there is more than sufficient to meet all demands.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *January 7, 1898.*

SIR: I have the honor to inclose herewith two letters from Mr. Crane, United States commissioner at Circle City.

They indicate fairly the spirit of the people now in this country, and the conditions that must be met next spring. Should the action of the courts suit the masses there will be no trouble; if not, then they take matters in their own hands. The population is changing too rapidly to place any dependence upon receiving support when most necessary.

There is a very general exodus from this place, except those engaged in cutting wood. The remark which I often hear openly expressed, that "there is too much law and order here," may account for the movement, and Circle City seems to be receiving the benefit.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

NORTH AMERICAN TRANSPORTATION AND TRADING COMPANY,
Circle City, Alaska, December 27, 1897.

MY DEAR CAPTAIN RAY: Yours of the 20th instant received per Mr. Patton, and will say that I will put forth my very best efforts to preserve law and order and help you in every way possible. We fully expected you up on the Weymouth case, but of course your letter tells why you did not come. There was a "miners' meeting" called last Thursday evening, and the result was that our jail was forcibly entered and our prisoner was liberated and the outfit taken.

I have a plan to suggest and want your cooperation, and if you or your Lieutenant Richardson can possibly come up here I wish you would do so immediately.

Yours, anxiously,

J. E. CRANE, *United States Commissioner.*

NORTH AMERICAN TRANSPORTATION AND TRADING COMPANY,
Circle City, Alaska, January 1, 1898.

MY DEAR CAPTAIN RAY: I have been trying to organize a force to preserve law and order here, and have gotten to the point where a few of the respectable citizens and myself meet to-morrow and come to an understanding as to what support they will give me. A Mr. Montgomery threatens to shoot Dr. Merryman on sight, and they have been running to me to have Montgomery arrested—the same people that were instrumental in breaking the jail; but I have refused to act in the matter unless they give me some help in keeping our man after the arrest. I just noticed they are going to call another meeting to-morrow, Sunday, at 3 p. m.—for what, I do not know.

Hoping to see you soon, I remain,

Yours, etc.,

J. E. CRANE.

FORT YUKON, ALASKA, *January 13, 1898.*

SIR: I have the honor to report that, owing to rumors of extensive sales of claims in the Klondike district, an exodus from this Territory to Dawson has commenced in this vicinity, and I am informed by Collector Smith at Circle City that all who are able to do so are leaving there.

This is the natural result of the failure to discover any new mines in Alaska, as all interest is centered in the few very rich claims in the Klondike, and excitement is again stirred by purchases for speculation. The spirit that generally prevails among the people in this country is not one to be satisfied by any reasonable return for their time or labor, even where they are willing to work, but they have come here expecting to obtain great riches by some means or other than they have heretofore known; consequently they all flock where very rich deposits have been found. They see only the gold that has been taken out, but do not stop to consider that the same expenditure of labor and money in mines that, though yielding less per yard, but which could be worked cheaply, certainly would yield far better returns in the aggregate.

To the masses everything is misleading and false except cold and hunger, and they are accordingly bitter and resentful at what they term their bad luck. I hear only fair reports from Manook (Rampart City), the only mining camp in North Alaska besides Birch Creek, but nothing reliable as to any claims paying largely or at all. In my opinion they are only preparing for sales to the people expected up the river next spring.

Up to date there is nothing in sight or reported to justify the great excitement the discoveries in Northwest Territory started, or to avert a collapse of the many schemes now being promoted in the States to float stock based on alleged mines in Alaska. The advertising given this country by the newspapers, transportation companies, and mining companies has become criminal in view of the distress and suffering it has caused.

The people going from here to Dawson are hauling sufficient food to last them until the opening of navigation. There are but few dogs in proportion to the number of people, so the most of them are hauling their supplies on hand sleds. Dogs are selling at from $200 to $500 each at Circle City.

I can only reiterate what I have repeatedly reported, "that there is no cause for alarm either here or in the Northwest Territory, or any danger of starvation to any but those who are too idle to come after it.

My dogs having arrived (they were forwarded from Tanana over the ice), I shall start for Circle City and Dawson about February 1. This is the last report I will be able to forward from this place. I send it by the hands of Mr. Barnette, who expects to go through to Juneau.

The September mail from Seattle reached Circle City the last of December.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *January 21, 1898.*

SIR: I have the honor to submit the following report in the case of one O. E. Weymouth to show the peculiar trend of the public mind in the matter of justice as administered by a miners' meeting in this country.

I select this out of many others, as a part of it came under my own observation. Early in November Weymouth came before me, claiming to be destitute and liable to starve unless he could receive assistance, as he could not get credit, and for want of tools he could not cut wood, and as he claimed to be a prospector, provisions sufficient to feed him until the 1st of June, 1898, were issued to him upon his making oath he was without food, money, or credit. He took his outfit and moved it 10 or 12 miles up the trail, and there made a contract with a freighter to have it hauled to Circle City, agreeing to pay 25 cents per pound upon arrival at Circle City.

These facts coming to my knowledge, I advised Mr. Crane, the United States commissioner, and upon the arrival of Weymouth and his goods and the payment of the freight he caused the goods to be seized and had Weymouth arrested for obtaining them under false pretenses. The miners demanded his release, which Mr. Crane refused, but offered to release him under bonds if any of them would go his security for his appearance when called for trial. Whereupon the

miners broke open the jail, released Weymouth, allowed him to take with him his outfit of provisions, which he moved at once over to the saloon where the miners held their meetings, and there sold it at public auction to the people who had taken him out of jail, and then he (Weymouth) gambled the proceeds of the sale away at faro. A day or two after he started for Dawson, saying he had a good outfit there. It is but just to say that the old miners and prospectors have nothing to do with such proceedings, but they are now in such a small minority that they are never heard from, and the newcomers call themselves miners and are running things their own way with past meetings for a precedent.

The tide of lawlessness is rising rapidly all along the river. I hear rumors of much discussion among the people stranded between here and St. Michael, and while it is only incidental, the fact remains that by the middle of June there will be several hundred people scattered along the Yukon without money, occupation, or food, who, unless controlled, may paralyze the traffic of the one great highway supplying all the upper river and add another chapter to the disgraceful annals of miners' meetings in our country.

If the commercial interests of the citizens of the United States are to be protected in the coming summer, they can not well be left to the tender mercy of such meetings, composed of men who are not citizens of the Territory, have no fixed place of abode, are here for what they can make, too often regardless of the methods, and are in a large majority.

I learn that the knowledge of the small force at St. Michael has had a most excellent effect, as the news has spread up the river, as many of the better element who have interests at stake have come to me to have the report verified, and express satisfaction that at last the Government is taking action.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *January 21, 1898.*

SIR: I have the honor to report the arrival here yesterday of Mr. John Carr, who left St. Michael with mail November 25, 1897, bound for Juneau. From his report, which I consider reliable, I am able to locate all the river steamers along the Yukon from St. Michael to Circle City, with their probable movements when the river opens.

At St. Michael, *The Yukon*, A. C. Company (75 tons on the ways); *El Sereno*, private (15 tons on the ways, building); A. C. Company, one river steamer, 300 tons; the Canadian Pacific Transportation Company, one steamer (river), 1,000 tons. At the mouth of the canal, 18 miles from St. Michael, the North American Trading and Transportation Company's steamer *J. J. Healy* (300 tons), loaded, and steamer *Mare Island*, an old sidewheel ferryboat; private expedition; said she draws too much water to pass the bar. At Nunavak, the A. C. Company steamer *Alice* (loaded), and the *Merwin*, with the tug *Thos. Dwyer* (of the Eliza Anderson expedition). Six miles below old Andreafsky, the A. C. Company steamer *Margaret* (150 tons with barge), frozen in midstream. Twelve miles above Koe-ko-kans, the steamer *General Stoneman* (propeller), with barge. At the Russian Mission, the North American Trading and Transportation Company steamer *Hamilton* (300 tons), loaded. Nine miles below the mouth of the Tanana, steamer *Seattle No. 1* (200 tons), *May West* (60 tons), *Hattie B.* (tug), with barge, all private enterprises. At Circle City, the North American Trading and Transportation Company steamer *P. B. Weare* (300 tons); the A. C. Company steamers *Bella* (200 tons) and *Victoria* (50 tons), and the *St. Michael*, private (20 tons). It is reported that the North American Trading and Transportation Company are building at Unalaska three river steamers and one towboat for the Yukon trade, making in all twenty-three boats that will be ready to operate on the river with the opening of navigation. I learn that their movements will be about as follows:

The three new steamers and towboat now building at Unalaska will be towed to St. Michael, will there take on board their cargoes, and proceed up the river as soon as navigation opens.

Those at St. Michael will do the same, except the *El-Sereno*, which is owned by a party of prospectors, and will probably go up the Tanana or Koyukuk. The *Healey* is loaded and bound for Circle City and Dawson. The *Mare Island* has no cargo except the baggage and provisions of her passengers, and is reported to draw too much water to pass the bar at the mouth of the river. The *Alice* is loaded and bound for Circle City and Dawson. The *Merwin* and *Thos. Dwyer* are private enterprises, and carry no cargo except the baggage and provisions of her passengers. The *Margaret* is light, and was bound down when frozen in. Should she be saved, she would go to St. Michael for cargo.

The *Hamilton* is loaded and bound for Circle City and Dawson. The *Seattle No 1*, *May West*, and *Hattie B.* are private enterprises and carry no cargo except the baggage and provisions of their passengers. The *P. B. Weare* has orders to come here, take on board what may be left of the cache, including the liquor, and proceed to Dawson; the *Bella* to go to Fort Hamlin, take on board all the stores there and what may be left of the cache here and proceed to Dawson: the *Victoria* to go below for cargo. The *St. Michael* will clear for Dawson with passengers.

This makes available to relieve the situation at Dawson with the opening of navigation the cargoes of the *Hamilton* and *Alice*, aggregating about 500 tons, and provisions at Fort Hamlin and here, aggregating 250 tons more. These steamers should reach Dawson on or before June 10, while those from St. Michael will not reach there much before July 10.

The private boats will not cut any figure in relieving the situation, except to feed their own passengers. I learn from Mr. Carr that Colonel Randall, with 25 men, is at St. Michael. I have not heard from him directly. People in this vicinity are still moving out for Dawson, though recent favorable reports coming up from Manook are attracting a few.

A new discovery on the head of the Koyukuk is reported by Indians, and I learn several parties are starting for that country from Rampart City. The portage from Fort Hamlin to the Koyukuk is 80 miles. Everything is very quiet along the river.

The policy of forcing the people to cut wood at this point is having the best results, as in a distance of 50 miles there is now cut and banked over 5,000 cords, which will be increased to 10,000 by the time the river opens. This will greatly facilitate getting supplies up the river, as I learn it is the only point between here and St. Michael where any amount sufficient to meet the demands has been cut.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

FORT YUKON, ALASKA, *January 24, 1898.*

SIR: To guard against monopoly and unfair discrimination I have the honor to recommend that a town site of at least one section be reserved on the north bank of the Yukon River opposite the mouth of the Tanana, and as soon as practicable it be surveyed and platted and the lots disposed of at public auction under the land laws of the United States.

In my experience in the Territory I have yet to find a town, river, or landmark bearing the name of the late Hon. William H. Seward, whose name is so intimately associated with Alaska. I therefore respectfully suggest that, should my recommendation meet with approval, the city be named Seward. I have seen this illustrious statesman's name in but one conspicuous place in the Territory, and that was on a miserable little towboat at St. Michael, and even then the name was misspelled.

When I was at Tanana last September there was but one location made, that of Mr. Al. Mayo, for trading purposes, and his store was the only building in that vicinity.

Very respectfully,

P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.

SEATTLE, WASH., *February 3, 1898.*

DEAR SIR: It is possible that a brief written statement by me of the circumstances under which Captain Ray's dispatches were delivered may be opportune at the present time in connection with my bill for services. I therefore present the following facts:

Captain Ray forwarded his dispatches from Fort Yukon to Capt. John J. Healy, vice-president and general manager N. A. T. and T. Company, Dawson, Northwest Territory, making the latter his agent to send said dispatches out to Washington. Accompanying the dispatches was a personal letter to Captain Healy, making statements which caused the latter much uneasiness, inasmuch as a critical condition of affairs at Fort Yukon was outlined.

The difficulty of getting letters and papers safely out of Dawson to "the States" was well known to Captain Healy, and he had himself only a few weeks before paid a large sum of money to a man going out on other business over the winter trail for the safe delivery of business letters to Chicago parties. When Captain Ray's dispatches arrived, therefore, Captain Healy hardly knew what to do, so he stated to me. He was of the opinion that all of the men who could be depended upon to deliver the dispatches and who had other business to transact outside had already left Dawson, and he was unwilling to intrust the papers to strangers. The winter trail was considered difficult and unsafe to inexperienced men.

Captain Healy finally made me a proposition to carry out the dispatches. He stated that my previous experience in winter traveling in Alaska made him feel that I could safely make the journey and deliver the dispatches, and he considered it necessary to get them off without delay. I had no intention whatever of leaving Dawson this winter, having made arrangements to remain there writing articles for the Scripps-McRae newspapers in Cincinnati, St. Louis, and other cities.

Captain Healy told me that his partner, Mr. C. A. Weare, coincided with him in urging the arrangement, and they had determined to advance $1,000 for my traveling expenses, provided that I would undertake the mission, feeling assured that the United States Government would reimburse them when the circumstances were made known. At the same time they stated to me that I must likewise go on the journey without any contract price being stipulated, depending as they did upon the Government to pay for the service. I read Captain Ray's letter to Captain Healy, and also questioned Mr. Gasch, who brought the dispatches from Fort Yukon and was impressed with the belief that someone ought to take the papers out. I agreed to Captain Healy's proposition, and at once made arrangements to leave. Incidentally it might be stated that I forfeited thereby something over $400 which I would have received for certain newspaper work, which I had written authority to perform, and also sacrificed considerable personal property, which I could neither sell nor carry away. Furthermore, I missed the opportunity of entering a mining claim, as had been my intention if favoring circumstances presented.

I arranged to go with three other men leaving the country for speculative purposes, and thereby materially lessened the expense for dogs, etc.

We left Dawson December 20, 1897, my traveling companions knowing nothing of my business.

At Pelly River a severe windstorm destroyed the trail made by advanced parties, and from that point on great difficulty was experienced in forcing our way. The trip was a very rough one, and occupied thirty-five days to Skagway. The ice was treacherous in places, and once the sled broke through, but was saved. Arriving in Skagway on the evening of January 24, I found the *Rosalie* there and sailed on her the next morning for Seattle, arriving here January 31.

Several persons in Dawson, including the Canadian chief of police, Captain Constantine, read Captain Ray's open letter to Captain Healy, and I presume copies were made. A party of men, unknown to Captain Healy and myself, were leaving at the time, and it is believed one of them had a copy of the Captain Ray letter. As they left Dawson before Captain Healy had determined on his course of action, they were fully a week ahead of me in getting out, and in this manner, I presume, the fragmentary story of Captain Ray's situation was made public.

My trip out was made with the greatest possible celerity, adverse weather conditions notwithstanding. It was necessary to walk through the snow for thirty-four days, one day

additional being devoted to rest. The trip is one that I would not care to make again for $2,500, provided the object was a commercial one. I did not bring out claims to sell, nor do I see any compensation in sight, except such as the Government sees fit to give. My bill for services as filed with you is $2,500 for expenses and services, of which sum $1,000 is to reimburse Captain Healy and $1,500 is for myself. Considering all of the surrounding circumstances, I believe the bill to be a moderate one.

Not one of the persons leaving Dawson on business this winter expected to make less than a few thousand dollars as compensation for the hardships of the trip.

There are absolutely no reliable mail facilities out of Dawson at present, the Government mails having failed to materialize.

Respectfully, yours,

E. HAZARD WELLS.

Brig. Gen. H. C. MERRIAM,
Commanding Department of the Columbia, Vancouver, Wash.

[Telegram.]

PORT TOWNSEND, WASH., *April 15, 1898.*

ADJUTANT-GENERAL UNITED STATES ARMY,
Washington, D. C.:

I report my arrival here to-night, and will proceed to Portland in the morning. I have come out over the ice to enable me to report correctly on the situation. I left Fort Yukon February 23, and Dawson March 18. There has not been, is not now, any starvation at Dawson or along the Yukon, or any destitution that has not been relieved. There is abundance of food for all now there until navigation opens. I judge there are 8,000 or 10,000 people now going in via Chilkoot and Skagway. The rush seems past. I report for orders.

RAY, *Captain.*

WASHINGTON, D. C., *May 5, 1898.*

SIR: I have the honor to report that owing to the rapidly changing condition of affairs along the Yukon River, the absence of all means of communication with the United States, and the fact that from the 1st of April to the 1st of July it would be utterly impossible for me to either get out or have any communication with the Department, I deemed it my duty to make the attempt to get out of the country by traveling up the Yukon over the ice by dogs via Chilkoot to Seattle.

I left Fort Yukon February 23, 1898, with a team of dogs, leaving Lieutenant Richardson in charge, with orders to be governed by the instructions to me, and with the breaking up of the ice to proceed down the river to St. Michael and there await further orders from your office. I reached Circle City on the 26th and, after resting my dogs and having my sleds repaired, left there on March 1, reaching Forty Mile March 11, and Dawson, Northwest Territory, March 14. I remained here three days, visiting the mines on Eldorado and Bonanza creeks, and in gathering information relative to the condition of affairs in Northwest Territory, where citizens of the United States were interested.

I left Dawson on March 18 and passed over Chilkoot Pass on April 7, reaching Dyea next day, making a journey of over 1,000 miles by my log, and an average of over 26 miles per day for the actual travel. I sailed from Skagway on the 11th and reported here on the 22d of April. The journey from Fort Yukon was without any special incident, except the inconvenience and discomfort from three severe snowstorms and some delay caused by meeting with open water at White Horse Rapids and Thirty Mile River.

To any who may be required to make the journey, I suggest that the start from Dawson should not be made later than March 10.

Much of the success of my journey I owe to the courtesy and assistance extended to me by the Canadian northwest mounted police. Major Walsh and Captain Constantine granted me free use of their stations and supplies throughout the whole route, which enabled me to travel with great rapidity, and it was only necessary to haul supplies between their stations.

FOOD SUPPLY.

From Circle City out I did not find any scarcity of food. On the contrary, there is plenty at Dawson and Fort Yukon for all the people now there, and those now on the trail are each required by the Canadian government to take with them 1,000 pounds of the essentials.

It is conceded by all who have been in the country for several years that food has never before been so plentiful at this season of the year.

I found flour selling in the gulches in the Klondike at $30 per sack of 50 pounds and salt meats at 75 cents per pound, when in January the prices were $150 per sack and $1.50 per pound.

This is owing to the fact that last fall private parties bought and hoarded supplies, hoping to get starvation prices in the spring, and now, while the stores at Dawson are without food, the crisis is past and there is no extraordinary demand, and all are anxious to unload.

With the large food supplies being carried in by people entering the country via Chilkoot, I am of the opinion that the reliable companies operating the river lines of boats will be able to place along the river an abundant supply of food for all who can possibly get into the country this year; but the ability of a large per cent of them to pay for it is very much in doubt.

MILITARY POSTS.

Since my last report on this subject I have become convinced that the conditions have materially changed, and the great influx I witnessed at Chilkoot and along the lakes will necessitate a much larger force than I then contemplated. I now suggest that not less than two companies be placed at the mouth of the Tanana, one at the mouth of Mission Creek, and one at St. Michael.

There is an abundance of timber to construct the posts at Tanana and Mission Creek, and for the post at St. Michael I suggest that the buildings be constructed of stone. Just east of the church is a high, rocky bench, where a rock foundation can be obtained and a great abundance of excellent rock (lava) for building purposes. The climate at St. Michael is very severe and damp. The most of the island is very wet and boggy, covered with a heavy growth of sphagnum. Frame buildings are very cold and perishable in this climate. By constructing the buildings of lava rock, two stories above a basement, they will be dry, comfortable, and very durable, and can be economically heated. It will be necessary to ship only lime and cement and the necessary flooring and finishing lumber. In the event a battalion can not be spared for this service, I respectfully suggest that a post at Mission Creek be established and two companies placed there. With a strong garrison at this point and a detachment at St. Michael, guarding the only two points of exit and entrance to the country, the moral effect upon the lawless element will tend to discourage crime.

I deem it of the greatest importance that the points on the Yukon I have recommended should be occupied with the opening of navigation, for with the people now in Dawson and along the Yukon River in Alaska between the boundary and St. Michael, augmented by the people I have seen going into the country by Chilkoot, the opening of navigation will find nearly 18,000 people in that country, which on our side of the boundary is without any semblance of law, civil or military. Under existing conditions I can not see how the civil authorities can possibly give any protection to life and property, and my experience has been such that even if they had all the personnel on the ground they would be powerless to deal with the questions that will confront them the coming summer.

POPULATION AND SETTLEMENTS.

I find that the population is rapidly shifting from Northwest Territory to Alaska. While on my journey out, between the boundary and Dawson, I met fully 300 people going down the river, and the general answers to my questions were, they were going to Alaska to stay.

This migration is attributable to two causes; first, dissatisfaction with the Canadian mining laws, especially the royalty on the output; and the fact that the whole country in the Klondike

district has been staked and there has not been any new rich discovery made in the Northwest Territory since the Klondike strike, so that many good-paying districts in Alaska that were abandoned when the Klondike rush occurred are now being relocated. The most noted are Birch Creek, Seventy Mile, American Creek, and Mission Creek. As I came up the river I found many people gathered at the mouth of Mission Creek and Seventy Mile. Towns are being built at both places. The former is called Eagle City and the latter Star City.

The principal points in Alaska where people are now congregated in any number are as follows:

On Forty Mile River, west of the boundary, about 140.
Mission Creek (Eagle City), about 200.
Seventy Mile (Star City), about 250.
Charley River, about 180.
Coal Creek, about 75.
Circle City, about 250.
Fort Yukon and vicinity, about 350.
Rampart City (Manook), about 500.
Tanana (Seward), about 250.
Wintering between Tanana and St. Michael, about 200.
St. Michael, about 250.

ROADS.

I deem it of the greatest importance for the development of the country that roads should be opened, so as to enable the people to enter the country not only from the Yukon to the open sea in our own country, which is of the greatest importance, but to enable miners and prospectors to get into the interior with their supplies. Under existing conditions persons can enter the country only by the one great highway—the Yukon River—and they can not hope to be landed at any point in Alaska earlier than July 1.

The gold-bearing districts are from 50 to 150 miles back from the main stream. There are not any summer trails except foot trails, and provisions and mining tools can only be transported on the backs of men. But few entering the country for the first time have sufficient means for packing, consequently it is impossible for them to get to a point where they stand a chance of finding a claim that will pay before the frost closes the streams, so as to make travel by sled over the ice along the smaller streams possible; consequently persons entering the country for the first time should have provisions or money enough to supply them for two years.

All of the interior back from the Yukon is still practically unexplored, geographically or geologically. With the opening of roads through the forest, so that horses, mules, and cattle may be used, will come cheap transportation, and large mining districts will be opened up that can not now be worked at a profit owing to the high price of food. I recommend that an appropriation of $100,000 be asked for to be expended under the direction of the commanding officer of the district in first opening a road from Seward to the head of Prince William Sound or Cook Inlet, the next a road to be opened north from Seward to the Koyukuk.

MINING AND OTHER INDUSTRIES.

I do not find anything either in Alaska or Northwest Territory to justify the great rush of people to that country, or the enormous investments now being made in transportation, trading, and mining companies. In Northwest Territory no discoveries of extraordinary richness have been made since that of the Klondike, and the paying claims are almost entirely confined to Bonanza, Eldorado, Dominica, Honka, and Sulphur, with a few claims on Bear Creek. In this district all rich claims are well known and held at very high prices, and while the whole country has been staked it has been done for speculative purposes, and no work is being done except such as is necessary to hold a title until they can be sold to the unwary newcomer or disposed of in the States for corporation schemes. Captain Constantine, of the Canadian Northwestern mounted police, is my authority for denouncing the movement as a fraud.

In Alaska there are only three districts that were being worked at the time I left. They are Manook Creek, Birch Creek, and Forty Mile; but very few claims were being worked in each. It is well known that there are extensive districts along the Tanana, Koyukuk, Porcupine, and Juan de Leur that will pay from $12 to $20 per day per man, but none are being worked, as such claims can not be made to pay with the present price of food.

In the absence of any industry, except cutting wood for river boats, I do not see anything in the future for over 90 per cent of the people now flocking to that country but disappointment and suffering. Even those who obtain employment at $1.50 per hour find that after deducting the cost of food, packing, candles, etc., they do not net to exceed $2 per day, and they tell me it is barely enough to tide them over the idle season.

Up to date no paying mineral lodes of either gold or silver have been discovered in north Alaska, so far as known.

FUTURE DEVELOPMENT.

I am fully satisfied that in the near future Alaska will be the source of great wealth, but the development will necessarily be slow owing to the climatic conditions. I recommend the early introduction of horses, mules, and cattle, and extra inducements should be held out for the development of agriculture in the valley of the Lower Yukon especially. Wild hay can be obtained there in great abundance, and oats, barley, and spring wheat can be successfully cultivated, as well as potatoes, turnips, and all the more hardy garden vegetables, all of which would be required for many years to meet the local demand, and by reducing the cost of transportation and food render it possible to profitably work a large per cent of the mines now lying idle.

As an instance bearing on this subject: There was a yoke of cattle landed at Fort Yukon last fall by the North American Trading and Transportation Company. In November the last of the forage was exhausted, and thereafter they were subsisted on grass gathered by Indian children from under 3 feet of snow. They were worked all winter hauling wood and logs, and were in good condition when I left.

But few of the people now entering the northern part of the Territory will ever become a factor in its permanent development. They must pass away before the time when the wealth of the country will become known and developed. To promote this I recommend that several well-equipped parties be put in the field and a thorough geographical and geological exploration of the country be made, so that men of ordinary means will be able to engage in the work of prospecting and mining. At present it requires considerable capital to first explore the country for a practicable route to transport supplies before any work can be done in prospecting.

FINANCE.

The ruling rate of interest at Dawson is from 10 to 12 per cent per month, which is the best exemplification I can give of the speculative condition of the finances of that country.

Very respectfully,

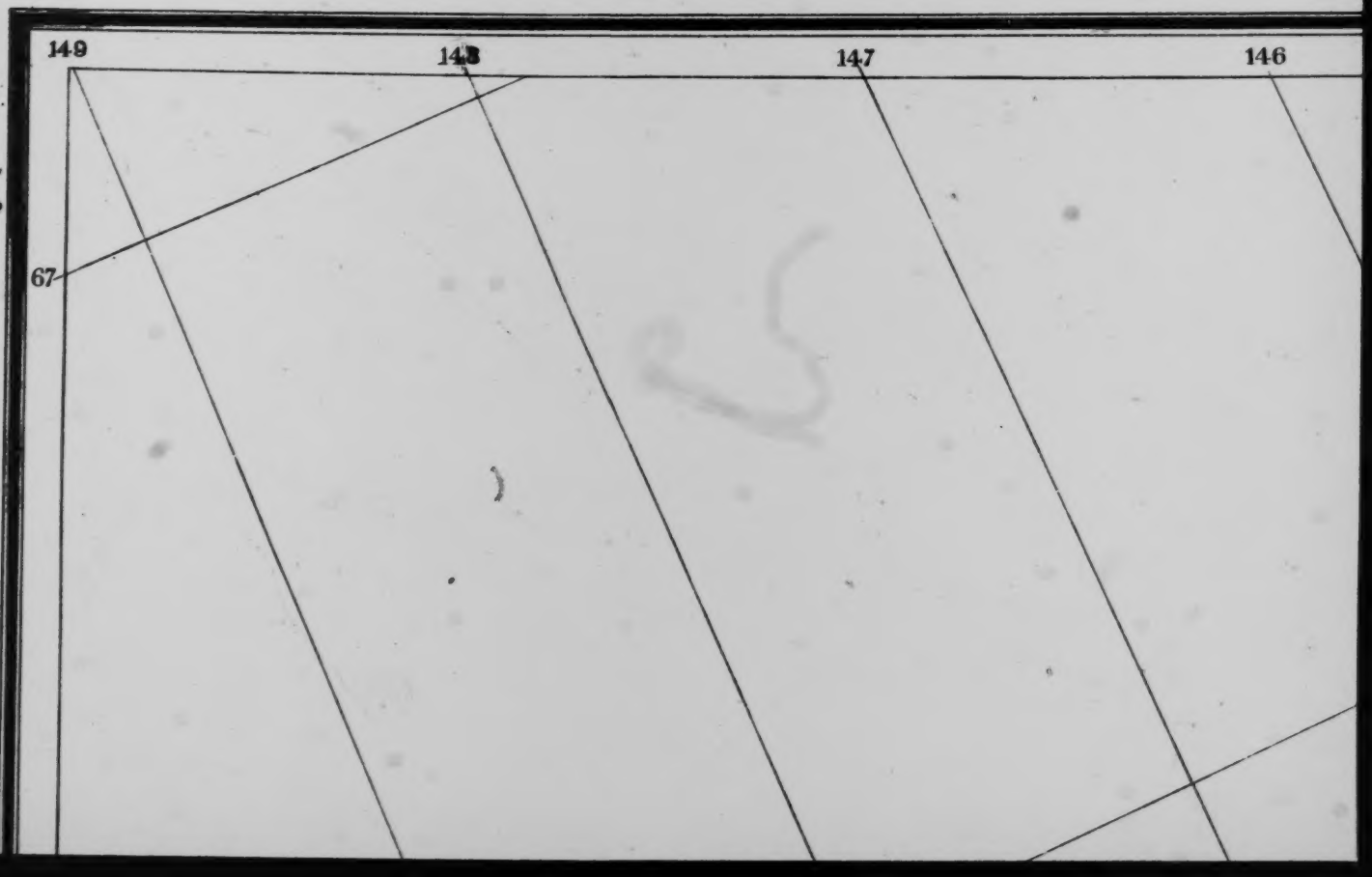
P. H. RAY,
Captain, Eighth Infantry.

ADJUTANT-GENERAL UNITED STATES ARMY.

ALASKA.—1898.

COPPER RIVER EXPLORING EXPEDITION.

Capt. W. R. ABERCROMBIE, Second United States Infantry, Commanding.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YUKON RIVER

CIRCLE CITY

BIRCH

Stream

Mouth Cr

Charlie River

Tahkeenna Cr

SEVENTY MILE

70 Mile Creek

Mission Cr

EAGLE CITY

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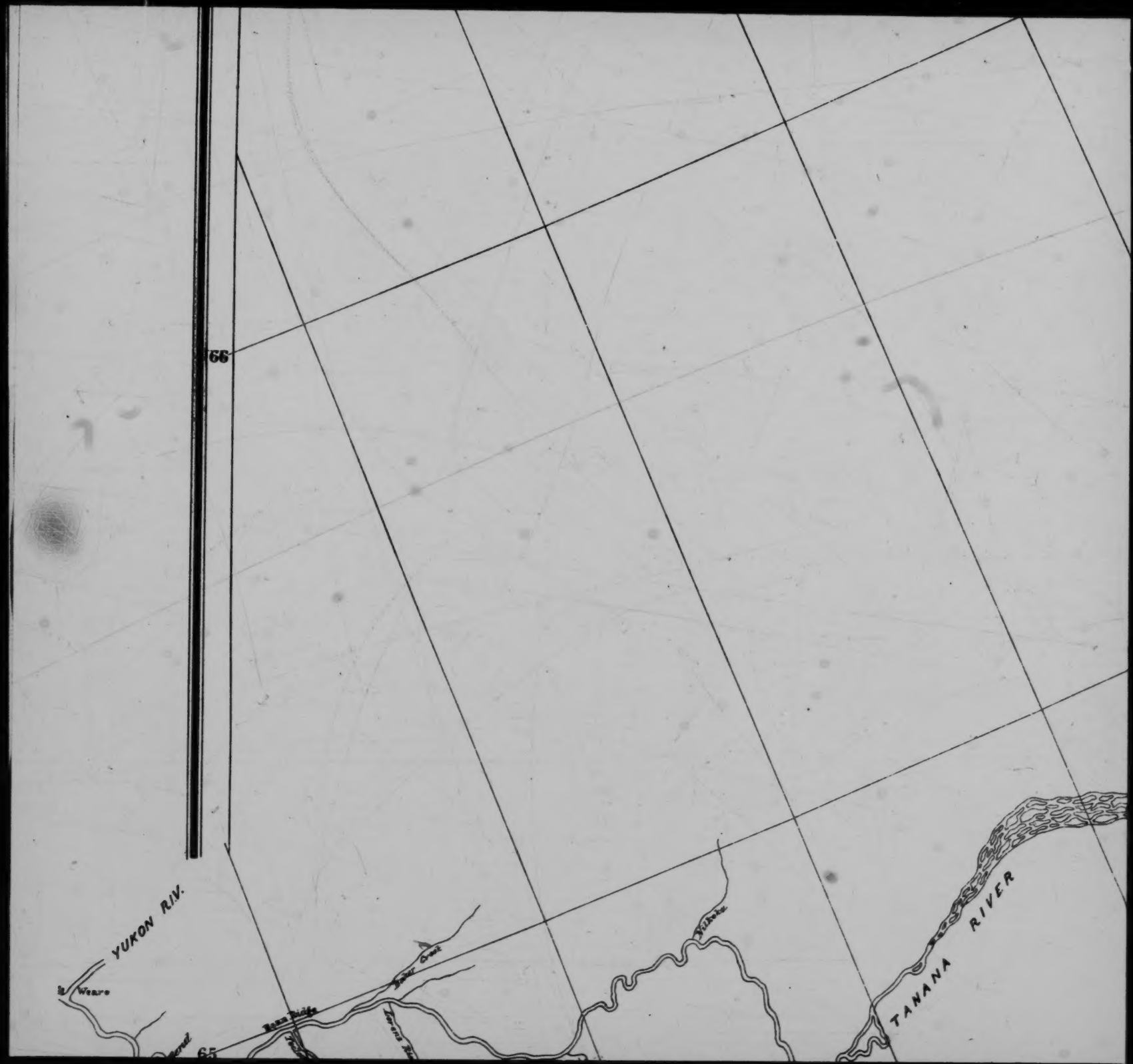
DAWSON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YUKON RIV.
Weare
Yukon
TANANA RIVER

MASTADON DOME
North Fork
South Fork
Lieut. Castner's Trail
Miller Cr.
Chena River
Salcha River
Flag Hill
Circle City Trail
Bates Rapids
TANANA RIVER
Goodpaster Riv.
Tower Bluff
Cathedral Bluff
Rapids
Lake Mansfield
KETCHUMSTOCK HILLS
FORTY
Champion Cr.
Alder Cr.
Jarvis Cr.

DAWSON
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FORTY MILE
CREEK
MILE
Sixty Mile Creek
Lieut. Lowe's Trail
TANANA RIVER
Eagle
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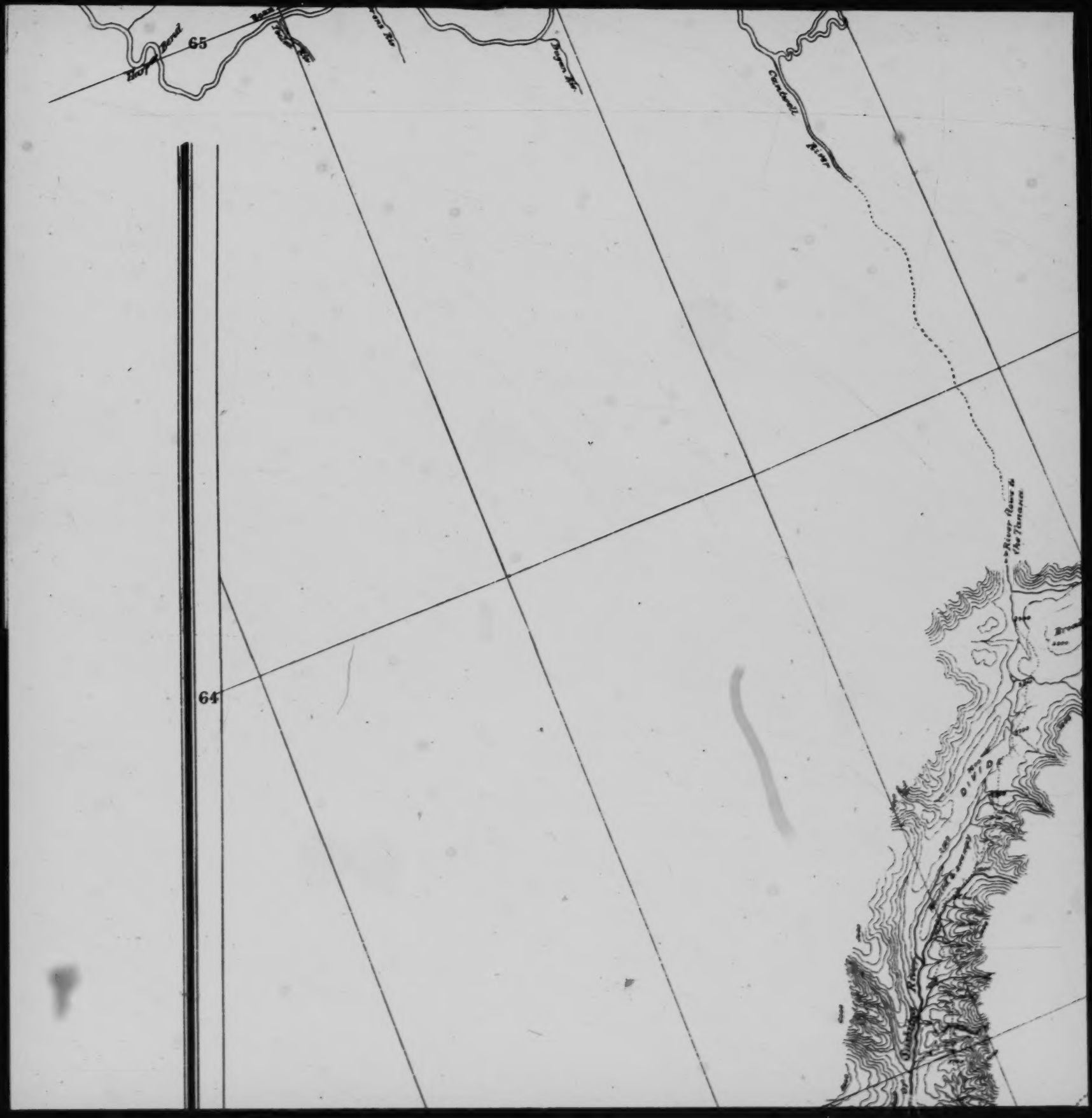
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64
Caudwell River
River Rees & the Thames
DIVIDE

ALASKA MOUNTAINS

Mt. Hayes

Delta River

Snow Peaks and Passes

Canwell Gl.

Mt. Kimball

Lake Manahaha

Mt. Hit

Chistochina River

COPPER RIVER

Mt. Sanford

Sanford River

Mt. Drum

Lieut. Lowe's Trail

Lake Louise

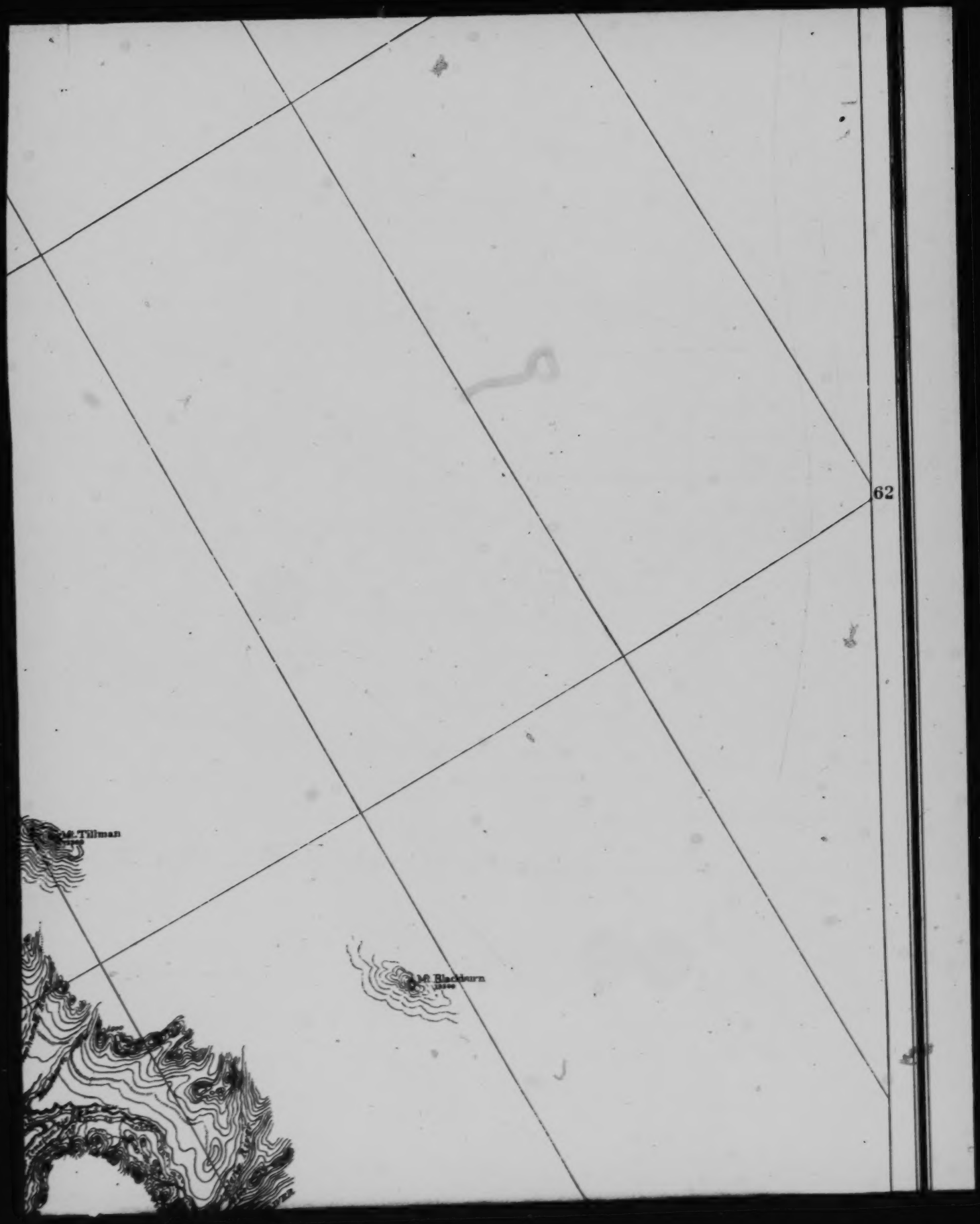
Lieut. Castner's Trail

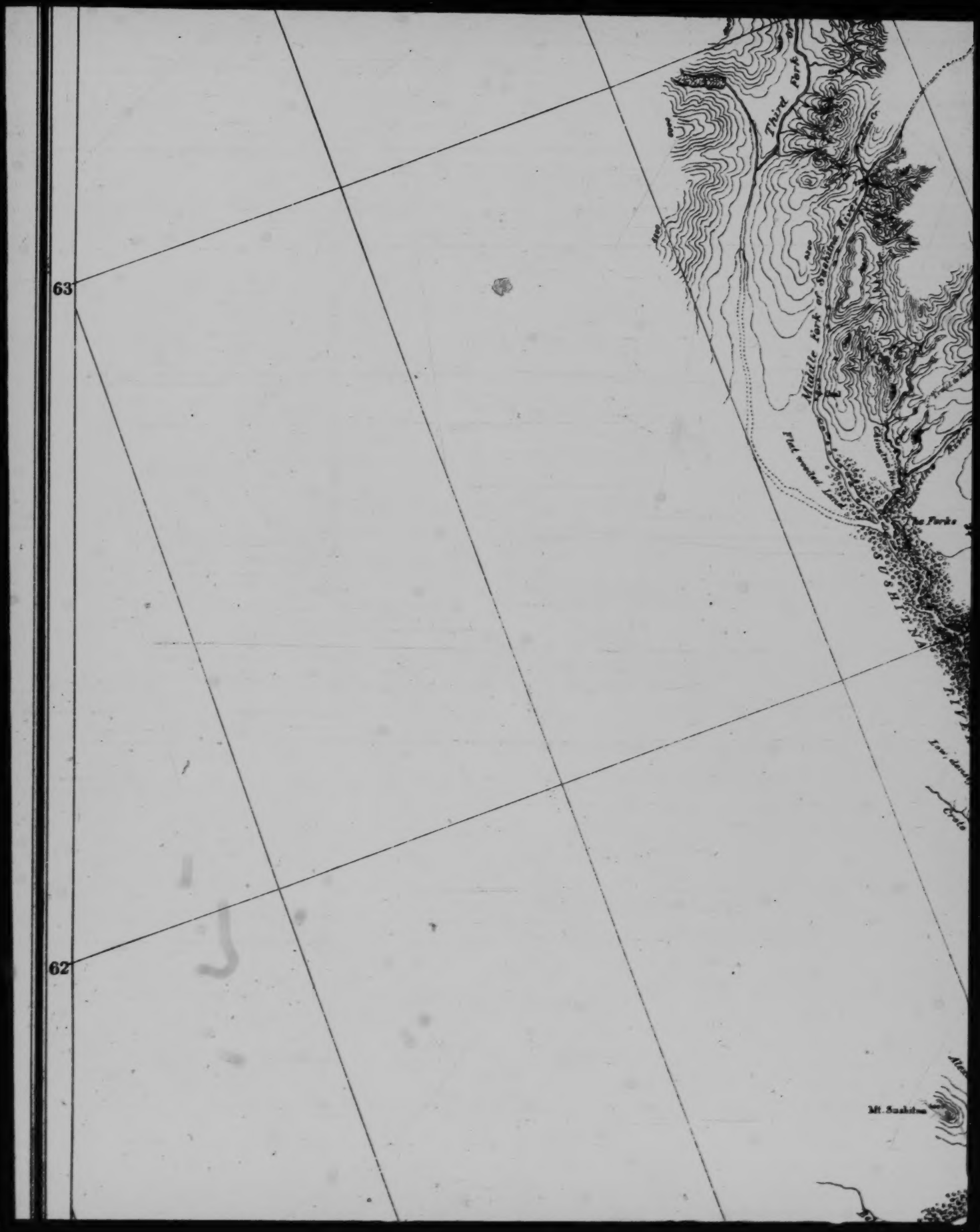
Tazlina River

COPPER CENTER

Clay Bluffs

Plateau thickly wooded


62
Mt. Tillman
Mt. Bladdurn


63
62
Third Fork
Middle Fork of Susitna River
Flat wooded Land
Parks
SUSHITNA
Mt. Susitna

TALKEETNA MOUNTAINS

CHUGATCH MOUNTAINS

Route of E. C. Schrader & E. Mendenhall

Lieut. Caldwell's Trail

Lieut.

Parks Route

Little Susitna River

Knik Arm

Port Wells

Prince William Sound

Meikle John Entrance

Cape Hinchinbrook

Lake Abercrombie

Tazlina River

Twin Glacier

Burry Glacier

Burry Arm

Glacier Bay

Pt. Fremantle

Pt. Pellew

Pt. Cadiran

Glenn Lake

Low Glacier Basin Lake

Eshamy Bay

Port Fidalgo

Port Gravina

Cordova

Valdez

Mt. Thomas

Pt. Lowe

Pt. Johnson

Hatcher Pass

Knik River

Yukla Creek

Indian River

Susitna Station

Moose Creek

Goose Id.

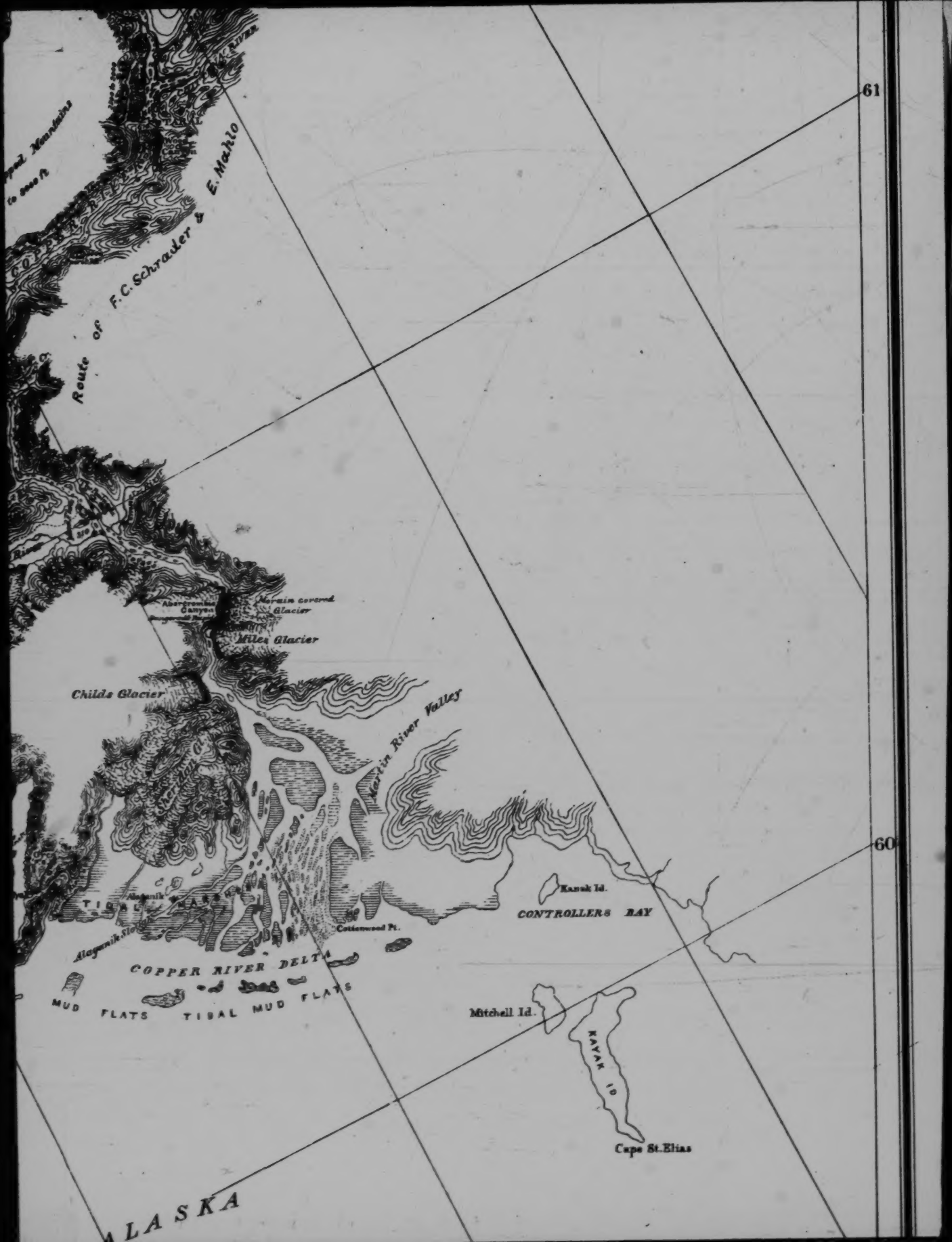
Kinsley Island

Porcupine Pt.

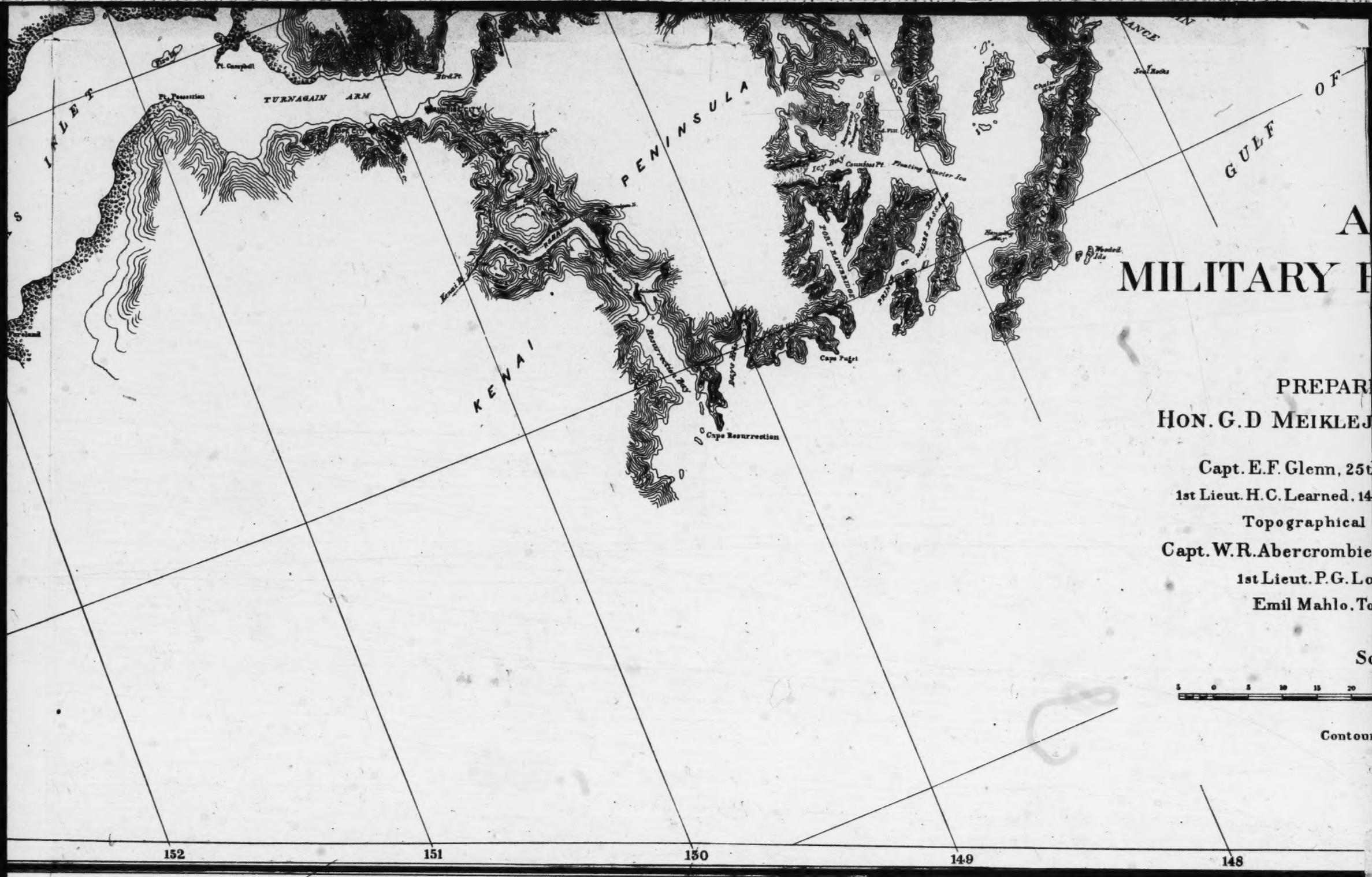
Grafton Pt.

Michaelo Pt.

Rugged snow-capped Mountains 5000 to 9000 ft


61
60
Route of F.C. Schrader & E. Mahlo
Childs Glacier
Martin River Valley
Kanak Id.
CONTROLLERS BAY
Cottonwood Pt.
COPPER RIVER DELTA
MUD FLATS TIBAL MUD FLATS
Mitchell Id.
KAYAK ID
Cape St. Elias
ALASKA

North Foreland
Tyonnock
Trading Bay
COOKS
West Foreland
61
155
154
153



A
MILITARY R

PREPAR

HON. G.D MEIKLEJ

Capt. E.F. Glenn, 25t

1st Lieut. H.C. Learned, 14

Topographical

Capt. W.R. Abercrombie

1st Lieut. P.G. Lo

Emil Mahlo. To

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Contou

MAP OF

ALASKAN

Y RECONNAISSANCE

OF 1898

PARED BY DIRECTION OF

KLEJOHN ASSISTANT SECRETARY OF WAR

n, 25th Infantry, Commanding Expedition No. 3.

ned. 14th Infantry & 1st Lieut. J.C. Castner, 4th Infantry,

hical Officers; W. C. Mendenhall, Geologist.

ombie, 2nd Infantry, Commanding Expedition No. 2

G. Lowe, 18th Infantry, Topographical Officer

nlo, Topographer; F.C. Schrader, Geologist.

Scale: 1 inch = 6 miles.

20 25 30 35 40 45 50 55 60 65 70 75

ontour Interval Approximately 500 Feet.

Topography drawn by E Meahle; title and border by C.H. Ourand

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A MILITARY RECONNOISSANCE OF THE COPPER RIVER VALLEY.

By Capt. W. R. ABERCROMBIE, Second United States Infantry, Commanding.

Crossing Puget Sound, the expedition which I had the honor to command arrived at Port Townsend on the morning of April 8, 1898. From this point two routes of travel diverge. One is known as the "inside passage," which follows up the straits and sounds between the mainland and Vancouver, Queen Charlotte, Prince of Wales, Admiralty, Baranof, and Chicagof islands, leaving the inland passage at Cross Sound. From thence it proceeds over the Fairweather grounds, which lie south of Mount St. Elias and the Great Malaspinia Glacier and Kyak Island, striking Prince William Sound and Meiklejohn Entrance, so named in honor of Hon. G. D. Meiklejohn, Assistant Secretary of War.

After leaving Port Townsend the outside passage turns to the left and passes through the Straits of San Juan de Fuca to Cape Flattery, from which point a direct course is laid to Meikle john Entrance. The latter passage is usually taken by vessels carrying full cargoes from port of clearance on the sound, and while much rougher than the inside passage it is not so dangerous, being free from sunken rocks and other impediments that render the navigation of the inside passage dangerous in the extreme.

As the reindeer for the expedition were to be picked up at Haines Mission, near the head of Lynn Canal, the vessel kept the inside passage. The entire trip from Puget Sound to Haines Mission was in one continuous driving snowstorm, which at times forced the master of the vessel to anchor under the lee of some island in order to determine his position. Arriving at Haines Mission Tuesday, April 12, the starting point of the Dalton trail for the Yukon Valley, Captain Eldridge, Fourteenth Infantry, commanding Expedition No. 1, was found encamped on the beach. On consultation with this officer it was discovered that the reindeer herd from which the expedition was to receive its means of transportation was so much debilitated as to be unavailable for that purpose. A quantity of subsistence stores which had been discharged by the bark *Seminole* a few weeks previous was found to have been exposed to the rain because of lack of canvas covering.

On April 13 an attempt was made to steam up to Dyea, 14 miles distant, but the expedition was compelled to return to its anchorage, as the steamer was unable to make any progress against the gale that had been blowing for the past twenty-four hours. Thursday, April 14, anchor was weighed for Dyea at 5.30 a. m., and at 8 a. m. the landing was made at that point. At the Fourteenth Infantry camp, located 5 or 6 miles up the gulch, application was made to Col. T. M. Anderson for 15 pack mules to be used by the expedition as transportation in lieu of reindeer. Owing to imperative orders from Gen. Nelson A. Miles, the application for pack mules was refused, as the mules had been ordered to be shipped to St. Louis, Mo. I thereupon returned to Haines Mission April 15, accompanied by Capt. E. F. Glenn, at 8 a. m., and proceeded with Captain Eldridge to Chilkat Inlet to see Mr. A. J. Kiellmann, who had charge of the rein-

deer train and attendants. Mr. Kjellmann reported that the reindeer were so weak that it would take at least three days to drive them into Haines Mission, and that in his opinion another sea voyage would kill every animal. It was therefore my judgment to return to the steamer and proceed to Port Valdez. Prince William Sound was reached on Sunday, April 17. Port Valdez was reached April 18 at 6 p. m. Here between 6 and 7 feet of snow were found on the level, which rendered the selection of a camp ground extremely difficult.

Returning to Valencia to make arrangements for the transfer of property pertaining to the expedition, it was learned that the quartermaster's department at Vancouver Barracks, Wash., had made no provision for the transfer of stores from the steamer to the shore. As current wages were offered and paid at the rate of $1 per hour, all that was left to do was to pack the entire outfit from a lighter beached at low-water mark to a point above high-water mark, through mud and snow, on the backs of the party, and make a cache. Considerable time was spent Tuesday, April 19, in sorting the stores belonging to expeditions 2 and 3. These stores had been indiscriminately stowed in the hold of the vessel with some 600 tons of miscellaneous freight belonging to prospectors going into the Copper River district. An equable division of the stores in the hold of the steamer was made on April 20. Those for Expedition No. 3 left the ship's side in the steamer *Salmo* for Portage Bay, while those for Expedition No. 2 were transferred to the lighter *Thlinket*, which was lashed to the stern-wheel steamer *Wildcat*, to which had been transferred the stores of the prospectors. Both boats were beached some 300 yards below high-water mark, which was a snow bank about 7 feet high, and from these boats freight was discharged as soon as the tide fell low enough to wade in with rubber boots and carry the packages ashore.

This was one of the most trying nights that the expedition was to experience during the explorations of 1898. The officers and men, not being used to the work they were called on to perform, were badly bruised about the shoulders and back. As the day was comparatively warm and the exercise violent, the clothing of the men became dampened, and in this condition they were forced to spread their blankets and sleeping bags on the snow by the cache without other covering and thus pass the night. The thermometer registered 8° below zero, but not a grumble was heard from any of the party, although at daylight the next morning some of the men were beating their frozen boots on the crust of the snow so as to get them in condition to pull on their feet.

Friday, April 22, was utilized in carrying supplies to Camp No. 1 from the cache until after the sun got warm and weakened the snow crust. The crust averaged from 3 to 8 inches thick and was capable of bearing from 100 to 2,000 pounds. On Saturday, April 23, First Lieut. P. G. Lowe, Eighteenth Infantry, topographical officer, was dispatched with Harvey Robe, a guide, on a side scout up Lowe River to look for and locate the old Russian trail into the Copper River Valley.

On April 26, First Lieut. Guy H. Preston, Ninth Cavalry, was outfitted for a scout over Bates Pass (so called in compliment to Maj. Gen. J. C. Bates, U. S. V.) into the Copper River Valley. Second Lieut. R. M. Brookfield, Second Infantry, topographical assistant, and F. C. Schrader, geologist of the expedition, were outfitted on the same day, with instructions to proceed over Bates Pass, sketching in the topography and noting the geological formation. On account of the continuous heavy snow fall, the scouting expeditions were compelled, April 30, to cache their outfits along the trails and snowshoe back to camp, to allow the blizzard to blow over and the snow to crust. Monday, May 2, the snowstorm which started April 27, and had continued without intermission up to that time, ceased and was followed by a rain of some five hours' duration. From April 27 to May 2 I estimate that some 6 feet of snow fell on the level.

From April 30 to May 2 snow slides kept up a constant roar. When the atmosphere cleared on the morning of May 2 the mountains presented a scarred and torn appearance, the result of the snow slides that had been heard during the storm. At 10 a. m. Lieutenants Preston and Brookfield, with Mr. Schrader, left for the summit of Bates Pass, Lieutenant Preston for the interior and Lieutenant Brookfield to sketch in the glacier and Bates Pass. A third party, under J. J. Rafferty, guide, was outfitted on May 3, with directions to proceed to the Bremner River

country. On the following day, May 4, at 2 a. m., I left Camp No. 1 with additional stores for the Preston party. The trail was found in an excellent condition. Seven miles from camp Lieut. R. M. Brookfield was found on the glacier, snow-blind, and a man was detailed to lead him back to camp. Some 4 miles farther on the Preston and Rafferty parties were found camped on the fourth bench of the Valdez Glacier, in Bates Pass. C. F. Schrader, geologist, reports the summit of Bates Pass to be 4,800 feet in altitude, and estimated at the time that there were about 700 prospectors on the trail of the glacier between the foot and the summit. The Tasnuna and Copper rivers on the following day were reported to be open. May 6 another party was started over Bates Pass, in charge of W. E. Goodman, jr., with additional supplies for the Rafferty party. The work incident to climbing the Valdez Glacier with sleds loaded with 100 to 150 pounds per man was now beginning to have a visible effect upon the members of the expedition, as well as the prospectors, in trying to penetrate the interior of that unknown region, the Copper River Valley.

An attempt to employ men to pack stores up to the summit of Corbin Pass (so named in compliment to Gen. H. C. Corbin, U. S. A.) proved a failure. A snow slide killed thirteen head of stock, and several men barely escaped death. Being without block and tackle, sledding on the steep ascents proved desperately hard work. As the men were beginning to fag out, I considered that I had taken every justifiable means to penetrate the Coast Range by man power. Private Tully having been taken sick at the summit, and a doctor having diagnosed his case as being typhoid fever, I directed that he be brought into camp on a sled. The reply came that if Tully was as sick as reported, to drag him 25 miles over the glacier in the present wretched condition of the trail would be tantamount to killing him. My rejoinder was that as he was lying in his sleeping bag in the snow, therefore the trip could not be more severe, and that all the necessary men should be detailed to bring him into camp. The mail steamer *Valencia* arrived from the south May 24. She was at once boarded to ascertain if any stock had been shipped up from headquarters Department of the Columbia for the use of the expedition. Finding no stock on board, nor any mail indicating that stock would be sent, I decided to go to Seattle in person as quartermaster of the expedition, where I could put myself in telegraphic communication with the authorities and get what was absolutely necessary for the success of the expedition, viz, pack animals for transportation. At Seattle I made formal application by letter and wire to the department commander, the General of the Army, and the Assistant Secretary of War for the necessary transportation to continue the explorations. The response that came to these applications was to purchase the necessary stock and ship them north.

Leaving Seattle and proceeding over the mountains to the North Yakima Reservation, two saddle horses and a guide were procured, as well as the required number of pack animals, pack saddles, etc. The latter part of June, 40 head of stock were shipped to Port Valdez. July 8 First Lieut. Guy H. Preston was by order relieved from duty with the expedition and ordered to join his regiment. The health of Lieut. R. M. Brookfield became so much impaired from exposure and overwork that it was deemed best to send him south, thus leaving but two officers with the expedition, viz, First Lieut. P. G. Lowe, Eighteenth Infantry, and myself. But as Lieutenant Lowe is a man to be killed but not conquered, no alarm was felt about the issue as long as he remained in good health. He was directed to organize a party, consisting of himself and 3 men, with 10 head of stock, and to proceed at once to Forty-Mile River via Mentasta Pass, with a view to locating an all-American route from Valdez to the Yukon. He was given the pick of the expedition. Out of the herd, which was by this time fairly well rested up from its long voyage, Lieutenant Lowe selected 11 head of the toughest and hardiest of the pack horses. After figuring the amount that each horse ought to carry, considering the character of the country, the boggy stretches and rapid streams to be crossed, the probable casualties from drowning and other causes, the outfit for his expedition was made as near complete as the material on hand would permit. I then looked over the ground with a view to deciding how I would cross the Coast Range of mountains. Two routes suggested themselves—one ran through the Keystone Pass and the other over the Valdez Glacier. The route by the Keystone Pass was abandoned, and the glacier was reported to be impassable for pack animals.

On consulting with Lieutenant Lowe it was decided that the course of duty lay over the glacier, even if all the stock and some of the men were lost in making the attempt. As it was a last resort, and utter failure stared the expedition in the face if the passage of the glacier was not successfully effected, I decided, after the return of the men sent over the Bates Pass with the Lowe expedition, to organize and equip a second expedition of four sections.

Section No. 1 was commanded by myself, its object being to cover as much as possible of that region embraced in what was known as the head of the Copper River district.

Section No. 2 was placed in charge of F. C. Schrader, geologist of the expedition, to explore and map the district embracing the Archer and Tiekell rivers, flowing into the Copper River from the west and heading in the Coast Range of mountains back of Port Valdez.

Section No. 3 was placed in charge of Emil Mahlo, topographical assistant of the expedition, whose district embraced the Kotsena and Tasnuna river valleys.

Section No. 4 was placed under the command of Corporal Robert Heiden, Fourteenth Infantry, whose orders were to cut and grade the trail up Lowe River and over Keystone Pass; thence to Thomson Pass (so named in compliment to Hon. Frank Thomson, of Pennsylvania), connecting with sections 2 and 3 on the head waters of the Tasnuna and Archer rivers.

This, it was considered, would practically take in all of the topography from the mouth of the Klutena River, about 180 miles above the mouth of the Copper and 90 miles east from Port Valdez, a very rugged and mountainous district, to penetrate which to the Copper River Valley was the problem in hand. It was my purpose prior to the departure of Lieutenant Lowe to follow him through the Bates Pass, but on receipt of his report, stating that "I do not consider the glacier feasible for animals from now until snow packs," I changed my plan, and decided to cut trail with my entire force up Lowe River and go into the interior by Keystone Pass. With this end in view the permanent camp at Valdez was abandoned July 18, with one packer and two horses to "prospect trail" up the Valdez Valley. Some 10 or 12 miles distant a number of very rapid glacial streams were crossed and the main glacier stream was reached. Owing to the constant rain of some ten days previous it was now a raging mountain torrent. Prospectors and others who had attempted to cross the stream prior to my arrival had failed; but as I had already forded a number of very ugly-looking streams, and as it was absolutely necessary to cross this one if I went in via Lowe River, I disregarded all advice in the matter and rode my horse into the stream with a view of swimming it if it was too deep to ford, believing that if my horse could carry my weight (215 pounds) the pack animals that I intended to load with but 150 pounds could also cross. When in midstream I heard the bowlders being washed down the river bottom, and knew that I was in serious trouble. I pushed on some 5 or 10 yards with the water up to my horse's shoulder when the animal was struck by one of these bowlders, carried off his feet, and washed some 150 yards downstream, rolling over and over in the torrent, while I clung to his mane with my right hand, covering my head with the left. While struggling to gain a footing the animal struck me on the left hand and head with one of his fore feet, mashing some of the bones of my left hand. At about the same time the horse lodged against a large rock with his feet uppermost, with my body pinned under him. I let go of the mane and grabbed the animal by the tail when, minus my blanket and outfit, the horse scrambled up the bank and pulled me up with him. The water registered 35 degrees, so that when I reached the bank I was unable to stand. Had it not been for the packer I would probably have been washed on down the stream and lodged in a drift pile.

Recognizing the fact that to bridge this stream and then cut trail for some 40 or 50 miles would take about the balance of available time for explorations left for the season of 1898, I returned to camp and made preparations for going on over Bates Pass. The following morning I found my entire left side to be black and blue and my left hand swollen to twice its normal size from the pounding I had received in trying to ford the Valdez glacial stream. Nevertheless, with Corporal Koehler and Private Bence, Fourteenth Infantry, I started for the camp established at the foot of the glacier by Lieutenant Lowe and began laying off a trail through the crevasses between the terminal moraine at the foot of the glacier and the top of the third bench. Private Bence was found to be particularly adapted to this work, and he was therefore appointed

guide of the expedition over the glacier, with instructions to patrol the trail from the foot of the glacier to the third bench, building small stone monuments and noting from day to day the changes in the crevasses and snow arches. In the meantime Packer Lynch, who had formerly been a farrier in Troop B, Second Cavalry, was set at work sharp-shoeing pack animals. This was an extremely difficult job, owing to the fact that it was constantly raining, leaving the sod saturated and the ground in the vicinity of the field forge a series of miniature lakes. The ponies, having never been shod, fought desperately. Each horse in being shod had to be thrown.

Everything being in readiness July 27, the fog set in so dense it was decided not to attempt to cross the glacier until landmarks could be discerned. July 31 Private Garrett was sent up on the third bench of Valdez Glacier to bring in eight prospectors who had lost their way in attempting to cross Bates Pass. Some of these men had been on the glacier for five days, and during that interval had abandoned everything—guns, clothing, and food. The action of the fog seemed to be governed by the warm, moist air rushing in through Port Valdez from Prince William Sound, which, when striking the cold air blowing over the glacier through Bates Pass, rose rapidly and was precipitated as snow and sleet on the summit and rain in the valley below. There was rain and fog August 1, 2, 3, and 4, and the humidity was so pronounced and so continuous that bacon and ham became one mass of mold, while the water of crystallization in sugar being liberated the sugar wasted away in the form of a sirup. One thousand three hundred pounds of commissary stores at the camp in Valdez were exchanged for an equal amount in the interior, thus obviating the packing of this amount over the glacier.

August 5, notwithstanding the foggy, rainy weather, the expedition was ordered to proceed at once for the interior. Camp was broken at 5 a. m. At the foot of the glacier Private Bence was found, and when asked what he thought of the prospect of getting over the summit, replied that if the wind shifted and the pass was missed, the stock and outfit stood a chance of being a total loss. On the arrival of the train at the foot of the glacier each section of it was inspected. Each section consisted of five horses, each horse being led by a man, and there was also an extra man and extra rope to each section. The instructions to the men were to proceed over the glacier at given intervals as a unit, and whenever a horse broke through a snow arch over a crevasse they were all to join at once in roping and pulling him out without unpacking. After seeing that everything was in its place, the train started, with Private Bence, with pickax and alpenstock, in the lead. I followed, leading my horse, on which I had packed a 5-gallon keg of whisky, to use as a stimulant during the night and the following day.

Passing onto the glacier, the animals seemed to know instinctively that there was danger ahead, as they would tremble and keep their noses close up to the backs of the men who were leading them. Whenever they broke through a snow arch, as they often did, they would lie perfectly still until roped. This applied equally to those which had been extremely shy and hard to approach prior to leaving the camp on the beach. As the expedition passed up through one crevasse, and turned to make an ascent of some 50 or 60 feet up a grade of not less than 45 degrees onto the cone of a hogback that was obscured in the thick fog, some of the civilian employees were inclined to be a little weak-kneed, as it looked very much like climbing up the fog into space. But by a judicious use of the stimulant referred to this was overcome, and, placing them along in the niches cut by Private Bence, we roped the entire train up with but few accidents. Now and then a horse would lose his footing and go down to the bottom with a rush. But as the trail was constructed so that all the attendants and packers were on the upper side of the horses nothing worse than bruises and cuts to the animals was the result of their falls. Never once did one of them refuse to climb out of an ice gulch when called upon, although many times they left a trail of blood behind them when the disintegrated rock of the moraine had cut them in their fall.

Arriving on top of the first bench, the fog was so dense that it was impossible to see more than five or six animals of a train at any one time. It was like a man groping his way in the dark, and at the end of two hours' traveling the expedition was completely lost. Every once in a while it was found that the melting ice had caused one of the stone monuments which had marked the trail to slide from its position. Then a halt would be called and Bence sent forward

in the fog, just far enough to keep within hail. Having found the continuation of the line of monuments, he would call back and the train would move forward again. These were trying moments. In this way the train was kept moving during the day and well into the night, until 12 miles had been covered up the glacier. Here a bivouac was made for the night, as it was becoming so dark that one could not see to go farther in the rain that had been falling in torrents the greater part of the day. The picket line was stretched from one ice hummock to another, the pack animals tethered, and the cargoes removed from the pack saddles. As the rain was extremely cold, the saddles and blankets were left on the animals to protect them as much as possible. Their grain was portioned out on the ice.

To each man in the party a small tincupful of whisky was issued, some canned meat, cheese, and hard-tack. Some of the men pitched their shelter tents on the glacier and attempted to sleep; but in a few minutes they joined their comrades, who kept up a steady tramp all night backward and forward in rear of the picket line. I here take occasion to remark in this part of my narrative that during my twenty-two years of service on the frontier I never experienced a more desolate and miserable night. Not only was the night black, but the rain was continuous. Occasionally the mighty glacier would crack as it settled in its passage to the valley below, with a vibration that would cause the men to stop in their tramp and the horses to nicker with apprehension, if not fear. Then would follow a deafening roar as some thousands of tons of ice was detached from one of the hundreds of glaciers that fringed the mountain sides. As these high fields of ice and snow would come crashing down onto the main glacier they would bound from wall to wall of the canyon, and the echo would die out finally down the valley many thousands of feet below. Like all other nights, this one came to an end. At daybreak another allowance of whisky was issued to the outfit, and the animals were packed and the party proceeded on its way toward the summit.

Four or five miles were covered, when a section of the glacier was encountered that was so bisected with crevasses of such width that for a while it was a question of getting through. But taking the train down a long narrow peninsula of badly crevassed ice, an outlet was found which could be doubled back on. The expedition was now in a position where it was as dangerous to go back as it was to go ahead. The mental strain on all at this stage of the journey was terrific. Progress was very slow; not more than a quarter of a mile an hour for the next three or four hours was made. Working in and out of this mass of crevasses, we finally crossed what was known as the fourth bench, and found ourselves on better footing. Up to this point the glacier had been free from snow. A zone was now reached where the snow and slush were about knee deep, through which we plodded. Looking up toward the summit of the pass, the eye could not define where the sky line began and the snow ceased. In the middle of this zone, which was limited only by the range of vision, was a beautiful stream of clear water, with a deep blue bottom. It seemed in perspective, being so rapidly foreshortened by the fog, to be a blue column ascending into the sky. Following up the banks of the stream there suddenly flashed out through the fog the panorama of the fifth bench, which was composed of huge ice cliffs, through which the wind shrieked and moaned in a most weird and unearthly manner, at an extremely high rate of speed.

During all this time the march had been confined to the center of the glacier. A course to the right was now chosen, and we struck off for the mountain on the right of the pass, with a view of avoiding the fifth bench and striking the snow slides on the right-hand side of the pass. This is the point where so much stock was lost early in the season from avalanches. A number of snowslides were reached which were packed as hard as ice, and over which the expedition traveled a number of miles, until the foot of the summit was reached.

This summit is where the glacier comes off the top of the mountain and is an abrupt descent of about 1,100 feet in the mile, or about 1 in 5. The effort required to climb this pitch can be realized, in a measure, when it is understood that to make 20 yards of the ascent at once taxed the wind and energy of the strongest mountain climber. The four animals and five men ahead on the trail resembled small birds following each other as one looked at them far above in the fog. Halting at intervals of 5 or 10 yards, the summit was finally reached. The wind was blowing a hurricane through the pass into the interior, accompanied by gusts of sleet and snow,

which, freezing as fast as they struck, coated men and beasts with an armor of ice. At this point, having a lighter load than the others, I found myself in the lead. I halted to wait for the rest of the party, but soon found that if I did not keep moving I would freeze. My horse also suffered severely from the cold. The wind was terrific. In vain I tried to catch some landmark to guide me in laying my course through the pass. If I made a mistake and left the pass by one of the feeders that came in from the higher peaks on each side, the remark of Private Bence of the day previous would be verified.

To stand still was impossible. The only thing left to do was to simply drift with the blizzard, and this I did. Fortunately for the expedition, the point at which the summit was reached was exactly in the middle of the pass, and whenever an attempt was made to veer either to the right or left from the true course of following through the pass the sleet cut the faces of the men so they would turn their backs to the storm and proceed in the proper direction. Had the wind blown into the pass from the right or left the expedition would have simply drifted out onto the great glacial fields. As the storm continued for several days, the men would have been snowed in, and probably the entire outfit frozen to death, as no living man could face the gale. But as luck was on the side of the expedition, it drifted through the pass and down toward the Klutena Valley.

After some five or six hours' travel in the howling storm, where it was impossible to hear or see a comrade, a high and rocky cliff was finally rounded and the expedition beheld the most beautiful sight I ever witnessed. The change was almost magical. Two yards after passing behind the shelter of this rocky cliff there was a perfect haven of rest and sunshine, while out of the pass rushed the howling storm like the water out of the nozzle of a fire hose. Throwing ourselves on the snow in the sunshine, at full length, we enjoyed the rest which only men can enjoy who have been battling for their existence. As if understanding the situation, the poor, miserable-looking pack ponies, their manes and tails all clotted with ice, lay down in the soft snow and grunted with satisfaction as the rays of the sun peeled the coating of ice off their bodies. After resting here a short time and eating lunch, the expedition proceeded down the glacier to the timber line. Here camp was made for the night in a grove of stunted cottonwoods and willows. I had now successfully crossed the Valdez Glacier at a season of the year when it was universally conceded to be impassable for man, making the journey in twenty-nine consecutive hours of practically continuous work, without sleep, rest, or shelter. The command was, however, in bad shape. The men were more or less frost-bitten about the ears and hands, and the pack animals bruised and lacerated to such an extent as to render some of them unfit for service. After enjoying the luxury of the camp fire, and relating to each other our various narrow escapes, we rolled up in our sleeping bags, and soon forgot the past in the sound and pleasant sleep that comes to the weary man in the field.

August 8 camp was broken early in the morning. The Heiden party and the civilians who had accompanied the expedition over the glacier returned to Valdez. The Klutena was crossed just below its source in the glacier. The expedition followed its right bank down some 4 miles to a grassy meadow behind a big, rocky bluff, locally known as "Twelve-Mile Camp." Here the shelter tents were pitched and blankets and clothing spread out to dry. After resting a day or two we pushed on down the valley toward Lake Abercrombie. Three or four smaller valleys open into this valley. At the head of each of these is a glacier, from which issues a stream of greater or less magnitude, depending on the sun's rays, which are exceedingly fierce on the glaciers and give a tremendous flow of water on the afternoons of clear days. Just above the head of Lake Abercrombie the streams unite and empty into that lake through many channels. I here noticed that the climate in this region must be rapidly changing. I also noticed that in many places the moss was as dead and dry as punk, so that when a fire was started for camping purposes it was impossible to put it out. The small, dry roots of the moss would smolder for days and weeks, until a favorable opportunity would fan it into a blaze. I noticed there was quite a mound of petals under each spruce tree, the branches coming close to the ground. When a fire had eaten its way to one of these trees through the moss, the petals would ignite, and the fire, rushing up the tree with a roar, would

create a flame 150 feet high. This would send forth a shower of sparks that would start thousands of additional fires, each to repeat the operations of the first. The entire valley seemed to be on fire, which made traveling through the timber very dangerous, as the falling trees were liable to injure man or beast, if they did not stampede the entire pack train.

Camping at the head of the lake, I sent two men over to a place called "Rocky Point," with instructions to get the rations traded for while at Valdez. They were also, if possible, to hire a boat to transport the stores to the foot of the lake, a distance of some 30 miles. This would save the horses' backs, which were now very much swollen and badly scalded from the wet blankets while crossing the glacier; at the same time would give a minimum impediment while passing through the burning timber.

On August 11 the expedition passed through, in the vicinity of some small lakes, the finest redtop and bunch grass I had ever seen. The pasture was so tempting I decided to camp there for the day. The horses showed wonderful recuperative power, filling out rapidly. In many places the grass was up to their backs. Sending two of the men into the timber to locate a trail free from forest fires, I took an opposite direction and climbed a sharp, rocky point. Finding but one course, I left the next morning for the lake shore. Here we arrived after meeting with several interesting incidents from falling timber, fire, and smoke. Along the lake shore we passed several camps of prospectors. These all complained of lack of transportation and inability to get up into the mountains with enough food for successful prospecting. As a result, many of them were selling out their outfits with a view of returning to their homes, cursing the Government for failing to build them a trail, as well as their own lack of foresight in not providing pack ponies to carry their supplies.

August 16 the foot of the lake was reached. Here was located one of the largest camps on the trail. The same conditions prevailed at this place. Here again the series of benches indicating the former existence of a lake is seen, the bed of which is now drained by the Copper and its tributaries.

On the following day the camp at the foot of Sunny Mountain was left, and the expedition followed down the Klutena. From where it leaves the lake to its entrance into the Copper this stream is approximately 30 miles long. In this distance it has a fall of some 600 feet and is a series of rapids. Two of the most notable are named Devils Elbow and Hell Gate. A conservative estimate puts the loss to prospectors in attempting to line their boats down this stream at $20,000. Food of all kinds was strewn along the river banks and drift piles for miles in a damaged condition, but not completely spoiled. Arrived at Copper Center, the expedition separated with a view of carrying out the previously arranged plans. Two packers and myself crossed the Copper River, while Mr. Schrader with his outfit crossed the Klutena to cut trail down the Copper, exploring the Archer and Tiekell river valleys. August 23 I left the Copper River. Climbing a series of heavily timbered benches, with occasional openings covered with bunch grass, I camped, late in the evening, at the foot of Mount Drum. Early the following morning I photographed Mount Drum and continued the journey over the plateau to a small lake 26 miles from Copper Center. Here a most excellent view may be had of the Copper River Valley. Looking to the west, the Coast Range may be followed by the eye to the point where it loses itself in the Turnagain Arm. With an interval of several miles, occupied by the mouth of the Knik River, looking to the northwest, the sun's rays are seen reflected from Lake Taxlena. Beyond this lake, in the distance, were seen the snow-capped Rockies, in which the Sushitna rises. This range of mountains marks the northern boundary of the Copper River Valley. Turning slowly to the right, the trend of these mountains is followed. At this point is noticed the contact formed by the Wrangell range, of which the towering Sanford, at the rear, is one. To the right, almost due east, is seen Mount Natalie, a spur of Mount Sanford. Between Mount Natalie and the range on which the camp was located we observed a valley, in which the Sanford River rushes and roars, although its abrupt banks hid it from sight.

Continuing our journey we crossed the Sanford, which in warm weather is a violent, turbulent stream, at times hard to ford. Climbing an abrupt gradient of 200 or 300 feet on the east bank, I found myself on a heavily timbered plateau with a gentle grade. We were now on the

slope of Mount Sanford. It is a most beautiful country. At the upper end of the small lakes which here and there dot the landscape hay meadows with the finest of redtop are invariably found. Passing over this plateau, the expedition camped for the night a few miles from Bowlder Creek. Here a photograph was taken of Mount Sanford, which bears about southwest from the camp. Early the following morning Bowlder Creek was crossed. Here the rocky trail was left, and, climbing through the heavy growth of underbrush that lines the bluff, we attempted a bee line for the mouth of the Slahna. The object was to verify the Indian reports that this country was filled with what was supposed to be an old lava overflow. After traveling some 15 or 20 miles, the report was found to be correct. A district was entered covered with lava slabs overlapping each other in the usual formation, and the entire mass covered with a thick growth of moss. Leaving the horses, a small butte was climbed, from which the glass revealed the continuance of the deposit up into the foothills of Mount Wrangell to the south. Retracing our steps in a northerly direction, after the hardest of work cutting trail and helping the horses over the pitfalls in the lava field, we arrived on the banks of the Copper River, just above the mouth of the Slahna. Here an easy ford was found.

Getting well into the Slahna River Valley, the character of the entire country is changed. Pieces of rock containing mineral indications of various character were found in great quantity. Lower down, at the water level of the valley, were immense meadows of the finest redtop, which would make excellent hay. The Norway spruce, so abundant in the lower levels of the Copper River Valley, now gave way to a heavy growth of white birch. Red currants and other berries were found growing in great profusion. The valley is a mile to a mile and a half wide. Continuing our journey up the valley I found, just above Lake Mentasta, what I deemed an available pass coming in from the west and Copper River Valley, with another near the head of the Slahna which the Indians said was connected with Robertson River, which flows into the Tanana.

The abnormal consumption of provisions caused by the hard work, together with the loss of supplies from exposure to rain, now necessitated a return. After crossing the valley and Mentasta Pass, the expedition followed up the East Branch of the Tok River. Near the head of this river I found three low divides. In order to locate the bearings camp was made while I ascended one of the highest peaks of the range. From this summit I had a very fair view of the surrounding mountains, being able to see distinctly the reflection from the water in the Tanana Valley. To the south and west the course of the Copper could be seen to the entrance of the Klutena. Underneath, to the right, lay a low pass into the Slahna Valley. I also saw another pass, in which heads an unknown stream. The Indians stated that this was the most direct route to the Forty Mile country.

Returning the next day to camp, I found on hand about 25 pounds of flour, 5 pounds of bacon, and a half pound of tea on which to feed two packers and myself while we journeyed back to the nearest settlement, which I estimated was 175 miles distant. Starting at once for the new pass, the Slahna River Valley was reached about 30 miles above its mouth. Finding that better progress could be made through the timber by stripping the horses, the outfit was placd on a raft. Being more familiar with boating than were the packers, I took charge of this craft while they started with the horses on a forced march down the river. By the time the mouth of the Slahna was reached the hard work was found to be telling severely on the horses. None of the parties of the expedition having traversed the Copper between the Slahna and the Klutena, I decided on the river route in preference to the trail to Copper Center by way of Mount Sanford. Some 10 or 12 miles down the Copper it was found the indistinct trail left the river and took off through some low flats. These flats are boggy, covered with individual tufts of grass in water and mud from 5 to 12 inches deep, making most fatiguing traveling.

During the second day's journey I met a man who claimed to have been sent north by a large cattle concern in the States to look for a trail by which to drive cattle into "Forty Mile" and Dawson. This man stated that he regarded the trail as perfectly feasible, as cattle would safely pass where a horse would mire down, and that he expected to drive in a small band of cattle in the spring from Valdez.

Crossing the Chestochena, which empties into the Copper through five or six different channels,

the expedition continued down the river on the edge of the bluffs. Here the trail was fairly good for a man, but entirely too narrow for pack animals, which were continually striking their packs against the trees, tearing everything to pieces and bruising their backs. After crossing the Gakona one of the horses displayed alarming signs of weakness. After taking off his load and trying in vain to keep him moving, the poor brute was led into the river and shot. The saddle, blanket, and equipment were cached in an Indian balagan.

Arriving at the mouth of the Tazlena, the expedition found a settlement of some eight or ten cabins, also something to eat. Crossing the Tazlena, Copper Center was reached September 27. Here my intention was to turn up the Klutena River to Lake Abercrombie, from thence follow a low divide to the left, crossing over into the Archer River Valley, and from thence by way of Thomson Pass into the Lowe River Valley, to meet sections 2 and 3 at the head of Lowe River. However, the Indians stated that these "sections" had been wrecked on the Archer River, losing their outfit, and were now without food. Hence I abandoned the Archer River route to Valdez, and at once set about collecting food for sections 2 and 3. Hiring a boat from W. S. Amy, Copper Center was left September 28, and Taral, 75 miles distant, was reached at 6 p. m. September 29 Woods Canyon was shot and junction effected with the party of Mr. F. C. Schrader about 20 miles below, at the head of Bremner Basin. Mr. Schrader informed me that he had followed the Copper down to where the mountains of the Coast Range and those of Mount Wrangell had formerly joined. He had ascertained that the gradient of the rivers given sections 2 and 3 to explore was so great as to render the task of cutting trail and bridging gulches beyond the strength of his small force of axmen. He reported that the Tiekell and the lower part of the Kotsena ran through a succession of canyons and that he had been wrecked in the Archer, where one man was drowned. After this he had found it impossible to proceed with his pack train. The character of the timber through which they had passed had entirely changed. Alders succeeded the Norway spruce. These alders reach a height of 12 to 15 feet, and grow extremely thick. Interlacing in many places, they form as impenetrable a mat as any equatorial jungle. Mr. Schrader's pack train was left with the Indian scouts at Taral, to be held until one of the employees of the expedition arrived, when they would be driven back to the winter camp. Proceeding down through the Bremner Basin with the entire outfit, I reorganized the expedition. Schrader and Mahlo were given provisions enough to last themselves and packers fifteen days. In that time I estimated they could reach Heiden Valley. This valley was so named in compliment to Corporal Robert Heiden, Fourteenth Infantry, the first to enter the valley. With such men as were not adapted to "back packing" I continued down the Copper in the boat. At the head of Abercrombie Rapids, just above Miles Glacier, the expedition camped to make a reconnoissance of the canyon. This was the point where, in 1884, I ineffectually spent two months attempting to get a boat up through the rapids. There has been a great change in the fifteen years elapsing between these two visits. The glacier is very much emaciated, and the channels through which the water rushes are much wider. The current, while less violent, is still of such a character as to preclude any thought of navigation under any condition. Shooting the first and second rapids successfully, the little party dropped down through the third and proceeded past Childs Glacier. On the faces of both Childs and Miles glaciers I noticed a very marked change. Miles Glacier had receded toward Mount St. Elias some 5 or 6 miles. Where in 1884 the Copper washed the face of this glacier was now an immense lake. Childs Glacier had likewise receded, leaving a beach some 500 or 600 yards in breadth between it and the water, but adding a succession of very boisterous rapids.

Continuing the journey down through the Copper River Delta, the expedition camped at the old Indian village of Alaganik, passed out of the delta and up the Eyack River through Eyack Lake. A short portage was then made to salt water, when Prince William Sound was followed along the shore; Cordova Bay, Ports Gravina and Fidalgo were crossed. On October 16 the expedition arrived at the camp at Port Valdez, having covered a little more than 800 miles afoot, on horseback, and by raft and boat since August 5.

I immediately dispatched my packers up through the Keystone Pass to Heiden Valley with rations for Schrader and Mahlo. I had been very much in doubt whether I would be able to

make more than a mere reconnoissance over what I considered would be the main line of travel and "all-American route" from Prince William Sound to the Yukon River. Prior to my departure in August from Port Valdez I had reported these facts to the assistant adjutant-general at Vancouver Barracks, Wash. One of the things that influenced me in making this report was the lateness of the season, as well as the great area over which the expedition would have to travel to explore the Copper River Valley and its tributaries. I therefore recommended that, to reap the benefits of the work and funds which had already been expended by the Department, the expedition be continued the following season. That no time might be lost, I had left instructions with a trusted employee of the Quartermaster's Department, Charles Brown, to open the reply to this report, and if it was favorable, to immediately begin the construction of suitable storehouses and stables for a winter cantonment. On my return in October I found a long stable, 27 by 81 feet, with a storehouse and granary, that had been constructed by returning prospectors in return for aid given them.

I now considered the field work of 1898 about over, and proceeded to adjust my accounts as quartermaster and commissary of the expedition. The following day Corporal Koehler, with Privates Garrett and Gardner, Fourteenth Infantry, brought Mr. Mahlo, topographical assistant, to camp via the Copper River and Prince William Sound. Mr. Mahlo had been attacked by heart failure, resulting from overwork and exposure while back-packing up the Tasnuna River. I at once employed A. M. Powell, a mining engineer and mineral surveyor, to carry the line with his transit in from Port Valdez through the Keystone Pass to a point on the Tasnuna River where he should meet the Schrader party. I hoped by this means to close up the circuit so nearly completed before winter set in. The following day Corporal Heiden, Fourteenth Infantry, in charge of the fourth section, reported the cutting and grading of the trail into the interior completed and a junction with the Schrader party effected. My pack train was immediately loaded with grain for the animals being driven in from Copper Center and with articles which were sent up the Heiden Valley, where the grain was to be cached.

October 23 the Schrader party returned to Port Valdez, reporting that Mr. A. M. Powell had been caught in a snowstorm, which interfered with his triangulation, and would remain in the pass until it had blown over. He was then to complete his triangulation and forward his notes by the last steamer sailing south for Seattle, about December 10. This closed the field work of the expedition for the year 1898.

In conclusion, this narrative is necessarily crude, as it was written prior to the receipt of the photographic illustrations or the molding of the field notes of the topographers into map form. I call attention to the reports of Lieutenants Preston, Lowe, and Brookfield, Acting Hospital Steward John W. Cleave, Corporals Heiden and Koehler, and Guide Rafferty. I highly commend the energy displayed by these gentlemen in collecting information which will be of untold value in the settlement of this northern frontier.

I also acknowledge the uniform courtesy with which Capt. O. J. Humphrey, local manager of the Pacific Steam Whaling Company, treated all members of the expedition.

DRAINAGE OF THE COPPER RIVER VALLEY.

The Copper, or Ætna, River is the main drainage of that valley, formerly the bed of an ancient lake, to the sea. The environment of the upper portion of this valley, which is formed by the main range of the Rocky Mountains splitting (a spur dropping off to the southwest, with the main chain keeping its general course with a gradual trend to the south, until it is finally submerged with the termination of the Alaska Peninsula), is a series of snow-capped sierras. The evidences of glaciation on the rugged faces of these mountains are everywhere present. While numerous glacier fields in active operation are met with, yet their emaciation is constant and very noticeable. The head of the valley is V-shaped in form, and, owing to the constant contributions of glacial silt in greater or less quantities by various glacial streams in their flow to the center of the valley from the glacial field in the mountain, are constantly scattering the glacial detritus over the entire plain without confining the flow of water to any one channel.

The depositing of this glacial silt on the roots of the willow and other shrubbery chokes them and destroys their growth, leaving acres of dead timber on the plain.

In the months of June, July, and August this plain, when seen with the reflection of the sun's light on the broad, shallow, glacial streams, presents the appearance of a mighty river. This condition prevails for a distance of some 30 miles to the west, where the Slahna enters the valley from the north. Here the slope of Mount Sanford from the south and that of the main range on the north join and dictate the natural course of the river bed, which still has many channels, although confined within a comparatively narrow area filled with numerous gravel beds. The current is noticeably swift, running probably 3½ to 5 miles an hour. The modern river is about flush with the banks at high water, while the ancient banks are arranged in a series of terraces. Here the course of the flow is almost due west. As the valley is followed down, the general trend is to the south, with a very slight increase in grade down to the mouth of the Chestochena. The river now becomes more serpentine, cutting the bank on the reverse curve. It here cuts out acres of the river bed in such a manner as to leave the spruce trees lining the banks inclining at various angles over the current. Some of these are left in such position as to just clear the surface of the water. These are known to the boatmen as "sweepers," for the reason that in descending the river they usually project into the main channel of the stream. In floating down the current the cargo of the craft is either scraped off or the boat upset when it meets one of these "sweepers," while in lining upstream the sweeper must be cut off. As the tree settles further, due to the erosion of the deposit under its roots, the top is caught by the swift current. It is then usually pulled out by the roots and lodged on the first sand bar as the nucleus for the formation of a drift pile. Through these drift piles the water rushes as through a sieve. This is another source of danger to boatmen which should be given a wide berth.

Passing the mouth of the Sanford the swiftness of the current increases. The banks are much higher, rising almost to the dignity of cliffs. Passing the Gakona the river unites temporarily in one channel. The banks here are high, I should judge 400 to 500 feet in altitude, exhibiting the sedimentary stratification of the ancient lake bed in a very marked degree. Beginning at the top of the scarp is a deposit of 3 to 8 feet of black mold; under this usually comes 1 to 2 feet of quite coarse gravel. Then follows a very fine clay with an underlying gravel, another series of clay with a conglomerate, with indications of a precipitation of iron staining the strata. Another series of clay cliffs dip into the river. Between the Gakona and Tasnuna this uniform stratification continues, with the introduction of a sandstone and a marked increase of the iron precipitation. Immediately after leaving the Gakona the river takes a sharp shoot to the south, leaving a flat of many thousand acres on the northwest bank, covered with a dense growth of spruce. On the reverse curve the river scours the southeast bank, leaving a scarp of some 600 to 800 feet in altitude with a gradual curve to the northwest, and in a like manner scours that bank.

Here we meet with a very pretty exhibit of the mineral characteristics of the main Alaska, or Rocky Mountain, range to the north, and the Mount Wrangell series to the south, indicated by the precipitation in the stratification. Passing the Tazlena, the river again scours and cuts the right bank, which is a clay formation. The current has increased to possibly 6 miles an hour. Passing this cut bank, the river leaves its ancient bed and turns in the direction of Mount Sanford. The curvature of the modern river bed shows a deflection of some 5 or 6 miles from the old curve. Bowlders and reefs in the river would indicate the proximity of bed rock to the river bottom. This is strengthened by the notable decrease in the swiftness of the current and altitude of the river benches when the ancient and the modern are compared. Passing the mouth of the Klutena, the current is now probably at its maximum of some 6 to 7½ miles per hour. The flow is erratic, being a succession of pitches, a term used to indicate a stretch of the river where the water has worn the river bed unevenly for a space of 800 or 1,000 yards. The current will drop to 4 or 5 miles an hour, when a drop or increase in the gradient of some 100 or 200 yards brings the rate of speed of the current back to its maximum of 7½ miles an hour.

Below the mouth of the Klutena the Copper River Valley begins to narrow down. These

conditions prevail to the mouth of the Chettyna, where it leaves the old lake bed and pierces the barrier formerly offered by the Coast Range of mountains. This point is locally known as Woods Canyon, and is 2¾ miles long, 200 to 400 feet wide, inclosed by walls of green schist 200 to 400 feet high. There are many features of this canyon indicating erosion by falling water, similar to that at Niagara Falls, and again there are spots where the evidences of erosion are lacking. There is no danger whatever in the erosion of this canyon other than that incident to the eruptive flow of submerged undercurrents, which, during extreme high water, are boisterous in the extreme. The vibration of these noises, echoing back from the surrounding cliffs, led the Indians to believe that this section was inhabited by spirits, hence the extravagant stories. The river continues more or less confined to one channel, and hemmed in by high mountains on both sides, with a very marked reduction in the speed of the current to within the vicinity of the Bremner and Tasnuna rivers.

This section is known as Bremner Basin, and is formed by the intrusion of a very large glacier coming out of the Coast Range of mountains from the west and cutting the river almost at right angles, forming a basin about 20 miles long and 5 wide. The river spreads out over this valley with its normal gradient. There is consequently a diminution in the speed of the current. This has caused a precipitation of all matter of a sedimentary character borne by the stream as it enters the valley from Woods Canyon, thereby forming a partially submerged valley filled with quicksands and sand bars. Passing out at the lower end of this basin, the gradient is again increased as the river winds around the glacial obstruction, bringing the current up to its maximum. Leaving this large, unnamed glacier to the right, the river now butts up against Miles Glacier, which is here likewise covered with an immense amount of morainic matter and a dense growth of alders, which effectively protect the glacier proper from inroads by the river. Striking a high range of mountains, the environment of the valley to the west, the river is again deflected south and enters the head of Abercrombie Canyon. This set of rapids has a canyon wall on the right side only. The left is formed by the encroachment of Miles Glacier, which cuts the valley just as the glacier at the foot of Bremner Basin does.

The left bank is the main mountain range. In this gorge are the rapids, or, as the prospector calls them, "pitches," formed apparently by rock reefs dipping into the river at almost right angles to its course. This gives the current a direct plunge, with a counter sheer from the right, as the banked-up water, striking this reef, is rolled back on top of the main current, as it were, many feet deep. Passing this reef, the water forms a series of whirlpools, which appear to move from one side of the river to the other, expanding and contracting. When two of these whirlpools, revolving in opposite directions, come in contact, the effect is startling. The water forms a cone some 6 or 8 feet high, with a terrific roar, and apparently bursts, beating the surface of the river into a startling mass. Some thousand yards below the first rapid a second reef enters the river, showing at low water a portion of its back in midstream.

In this rapid are encountered three forces, the direct plunge and the deflected currents from the right and left, forming a hollow some 6 or 8 feet deep, with a wall of water on each side. Like the first rapid, the second has a series of whirlpools below it for a distance of 500 yards, where the third rapid begins. This is a series of short "pitches" for a distance of possibly 700 yards, the water in places bounding up in the center of the channel from 12 to 15 feet. Below this rapid is a big, still eddy, some 800 yards in length and 300 yards in breadth. The greater part of the river, after passing through this slack water, turns abruptly to the left and plunges down a heavy gradient, and enters the lake or bay in front of Miles Glacier. These rapids are known, respectively, as the first, second, third, and fourth rapids. When I first visited this canyon, in 1884, there was but one rapid, the first. On my return this season the emaciation of the glacier was very marked. To the left of the second rapid the river had cut out the bowlders and worn a huge hole in the glacier, some 50 or 60 acres in area, which is the entering wedge for the formation of a new channel. The face of Miles Glacier, below the fourth rapid, has receded some 5 or 6 miles to the east, or back from the river, and during the months of June, July, and August the falling of bergs cut out by the comparatively warm river water from this glacier keep up a continual roar, as they fall off, that can be heard for a distance of 20

or 30 miles. This débris blocks the river below with cakes of ice that scour out channels and form new courses.

At times the river here is completely blocked with floe ice, making miniature packs, opening and closing in much the same manner as in the Arctic seas. Passing the face of the glacier, which has also receded from the river some 500 to 600 yards, leaving some 200 or 300 yards of very nasty, rapid water, the river is deflected to the left by a mass of terminal moraine, and enters the Copper River delta to spread out in a fan-like formation, and divides itself into thousands of little channels, interspersed with innumerable sand bars, which are covered with drift piles. During my explorations in this section of the country in 1884 this delta presented an entirely different appearance from that of to-day. Then the deposits were new and bright, the various channels more changeable, the process of "scouring out" and depositing more active. This I attribute to a more active discharge from Miles and Childs glaciers, with the consequent presence of a greater quantity of floating ice in the river, which kept the entire surface of the delta in a state of transition from sand bar to channel and from channel back to sand bar again. I think the channels are deeper in the upper part of the delta and the old ones shallower in the lower part. The bars at the mouth of the various channels appear to have formed themselves farther out into the ocean.

The amount of glacial silt annually brought down by this river must be enormous, as we have the phenomena of an ancient "bay," some thirty-odd miles broad and 37 long, entirely filled up with matter. This matter is ground so fine that the wind, which is constantly blowing in this delta, carries it like a bank of fog out over the ocean for a distance of 150 or 200 miles.

In conclusion, I would say that the main drainage channel of the Copper River is wholly unavailable as a means of transportation from the sea to the interior of Alaska.

SUBDRAINAGE OF THE COPPER RIVER VALLEY.

The Copper River, as known topographically, is a misnomer. This river is known to the natives as the Ætna. The Copper River proper is the eastern branch of the Ætna, designated on the map as the Chettyna. In the language of the Stick Indians, who inhabit this section of the country, "chetty" means copper and "na" river. It will be observed that the final termination of all names of rivers is "na." I was informed by the Indians that the Copper does not rise in the Copper River Valley, but in the topographical valley of the Tanana, flows in a westerly direction, and passes through a canyon in the mountain range which divides the Tanana from the Copper River Valley.

Some 20 miles to the east of this canyon is the mouth of the Slahna, the first tributary of any importance emptying into the Copper. The Slahna rises in a broad, flat valley, some 50 miles north of where it empties into the Copper, and passes in a southerly direction down a narrow valley which apparently cuts through the main mountain range. It receives occasional contributions from glacial streams until it reaches the vicinity of Lake Mentasta, where a large, clear creek, starting in a lake over in the Copper River Valley, enters the Slahna through a low pass. From this point the grade of the river bed rapidly diminishes, while the valley widens out. This continues for about 3 miles, when the outlet of Lake Mentasta, a clear stream, empties into the Slahna. The latter river now becomes sluggish and serpentine, winding through a valley varrying from 2 to 5 miles broad, dotted here and there with lakes of various sizes. Some 8 miles from its mouth a clear stream, the outlet of Lake Suslota, adds its tribute, while from the mountains on the west two more tributaries of clear water come in. Here the valleys of the Copper and Slahna merge in a broad plateau of glacial silt. About 5 miles east of the junction of the Slahna and Copper a glacial stream, flowing over a broad plain with many channels, enters the Copper. This stream drains the country in the vicinity of Mount Wrangell, and during the summer months carries a far greater volume of water than does the Copper at this point. This misled the prospectors, who followed it to its source under the belief that it was the Copper, only to find it an avenue of escape for the water from the immense melting glaciers, hundreds of square miles in extent, covering the northern slope of Mount Wrangell. During the winter season this stream ceases to flow.

Farther down the Copper, a glacial stream known as Bowlder Creek enters from the south. This drains the district between Mounts Wrangell and Sanford. This is a short, rapid stream, of no particular significance other than topographical features. Following down the stream three small creeks of no significance are passed, and the mouth of the Chestochena is crossed. Rising in the Rocky or Alaska range of mountains, this river flows in a southeast direction to its junction with the Copper. It has four large branches coming in from the north and one near its head from the southwest. Two of those coming in from the north are clear streams, the outlets of lakes; the others are all of glacial origin. While navigable for light-draft boats in the hands of experts, owing to its rapid current and shifting channels it can hardly be considered available as a means of transportation. Nearing its mouth the main channel divides itself into eight or ten small ones, and the river bed widens out into a delta some 5 or 6 miles broad.

The Copper River here makes a decided turn to the southward. Downstream some 12 or 15 miles is a stream coming in from the south, with channels and delta similar in character to that of the Chestochena. This is the Sanford, a short, rapid, glacial stream, the bed of which is filled with bowlders. It drains that section of the big bend embraced in the territory between Mounts Drum and Sanford. Its importance lies only in the dangerous ford at the crossing of the Millard trail which in warm weather often delays the traveler.

Continuing on down the Copper, quite an extensive plateau is passed over. This terminates at the mouth of the Gakona. The latter river heads in the Alaska range of mountains to the west of the source of the Chestochena, and parallels it to the Copper. It may be navigated by small boats but has a current like that of the Chestochena. Leaving the Gakona, a much smaller stream is passed, the Gulkana, which has no known notable features. The next on the list is the Tazlena, which is the west branch of the Copper River. This stream heads in Lake Tazlena, some 45 miles to the westward of its junction with the Copper. I estimate the volume of water carried by it quite as large as that of the Copper at this point. Numerous glacial streams empty into Lake Tazlena, which is reported to be from 5 to 10 miles broad and about 25 miles long. The currents in the Tazlena preclude any sort of navigation. At points it is filled with bowlders; at all times it is a mad, dangerous stream, which can not be forded at any season of the year, but must be swum in certain places where there are short stretches of smooth water.

Eight miles to the south is the Klutena, which is practically a duplicate of the Tazlena, but flowing in a northeasterly direction. The gradient of the river bed renders the risks incident to navigation prohibitive for commercial purposes. From the Klutena to the Chettyna, a distance of 64½ miles, are numerous streams of glacial origin, which may be classed as mountain torrents. The most important of these, on the right-hand bank, is the Tonsena, 39 miles from the mouth of the Klutena. Below the Tonsena is the eastern branch of the Copper River. This is the Chettyna, a comparatively short, violent, and unreliable stream, its rise and fall being very erratic. It drains the entire southern slope of the Wrangell series of mountains, which are literally covered with glaciers. The bed of this river is a succession of rapids and canyons. The left branch or Chettystone, which means, literally, "copper ore," heads up in the Scholai Pass, and its sole principal tributary rises in the White River Mountains. This stream is called by the natives "Chettytoo," or "copper water." The left branch heads in the St. Elias alps, far to the southeast. It is much more sluggish than the Chettystone, and therefore is more accessible.

Passing the Indian village of Taral, which is located at the confluence of the Chettyna and the Copper, Woods Canyon is passed. The schist barrier of this mountain range no doubt separated the waters of a former inland sea to the north. This canyon was formed by an erosion or a convulsion, which wore or rended the barrier. The character of the country through which the Copper River now flows has entirely changed. The river is closed in by high mountains and cliffs. The Tiekell, a glacial stream coming out of the mountains to the west, is a topographical feature only. Likewise the Kotsena, which parallels it and empties into the Copper 101 miles below the Klutena.

Below the Kotsena the character of the river bed again changes, spreading out into numerous channels and shifting sand bars. This is the head of Bremner Basin, which is formed by the partial closing of the Copper River Valley some 30 miles below this point. This is caused by

the deposit of enormous masses of terminal moraine from the seacoast glaciers which there fill the valley. Coming into this basin from the east is the Bremner River, a short and rapid glacial stream. This is a possible route over to the south branch of the Chettyna, by pack animals only.

Draining into the basin through numerous channels from the west is the Tasnuna, 117½ miles from the Klutena. The lower part of the Tasnuna is sluggish and navigable for boats of light draft. The upper portion of the river has cut through a portion of the mountain range, and is not available as a means of water transportation. However, this has a fairly good trail out to tide water on Prince William Sound; distance, 49 miles. From the mouth of the Tasnuna to the mouth of the Copper there are no streams in winter.

ECONOMIC GEOLOGY.

In the absence of the report of the geologist of the expedition, Mr. F. C. Schrader, United States Geological Survey, which has been delayed pending the assays now being made on specimens brought down by the expedition, I present herewith a simple summary.

On the coast in the vicinity of Prince William Sound we found mineralized zones rich in sulphides of iron and copper, notably at Port Dick, on the Kenai Peninsula; Latouche and Knights islands, in Prince William Sound, and at Copper Mountain, in Gladhough Bay. At most places the deposits are promising in copper, and at some places gold and silver have been assayed in paying quantities. In many places claims have been and in many others are being staked. At Gladhough Bay the ore vein is some 300 feet wide. The property has been bonded, and is being opened up by the Alaska Commercial Company. Should the mining industry develop to any great extent, it is probable that limestone for fluxing purposes can be found.

At some localities, in the supposed carboniferous rocks, the slates are so perfectly cleared and of such density and texture as to make a very good roofing slate; also suitable for other commercial purposes, and would doubtless be sought for in a country less favored with timber. It is not rare, as in Fidalgo Bay and on the point east of the entrance to Landlocked Bay, to find slate which can be readily broken into handsome thin sheets or plates 3 or 4 feet broad.

Placers have been reported at various localities, and I have been shown some very handsome coarse gold by a Mr. McClellan, who claims to have taken it out of the Copper River Valley. In all the tributaries to the Copper River I found fine or flour gold, in some instances as many as 200 well-defined colors to the pan of dirt. I have every reason to believe, and do believe, that very rich placer deposits will be found in the foothills of this valley. The great obstacle to the working of these placer diggings, however, is the thickness of the gravel deposit through which the miner must go to reach bed rock. On the Copper River, between the Chestochena and the Gakona, I saw evidences of what I believe to be large iron deposits. In the hands of the Indians I saw fragments of coal that was said to have been taken from the Gakona Valley. Mr. W. S. Amy, of Copper Center, shod the horses of Lieutenant Lowe's detachment, using coal taken from this district. In the Slahna Valley evidences of mineral deposits, indicated by float, was everywhere present. Ore containing free copper was found by me, and specimens are now in the hands of the Geological Survey which are being assayed.

Many claims have been staked out in the main Rocky Mountain range, concerning which another season will determine as to whether they are of sufficient value to warrant their development.

THE INDIANS OF THE COPPER RIVER VALLEY.

These Indians aggregate, all told, probably 300 souls. They have, by common consent or by conquest, divided the valley into various geographical districts. Each band keeps to its own territory while hunting and fishing, and resents any intrusion on the part of a neighboring band. It is not an uncommon thing, early in the season, for the Indians on one side of the river to go hungry if the salmon running on the opposite side are on the territory of a neighbor.

Their caches or balagans are never molested. When the spring thaw overtakes them they cache their toboggans and sleds without a thought of their being molested by anyone. Their houses are treated with the same respect.

THE TAZLENA INDIANS.

The strongest band in the valley are probably those living on the Tazlena Lake district, numbering in the neighborhood of 150—bucks, squaws, and children. They are decidedly the finest specimens of Indians I have seen in Alaska. Their chief is known and respected from Mentasta Lake to Cooks Inlet. Their territorial lines range from the mouth of the Tazlena, westward to the Knik River, and from the Tazlena eastward to the Gulkana, and northward to the main Rocky Mountain range. This section is one of the choicest game ranges in the valley.

THE GAKONA INDIANS.

These Indians, about 75 in number, range in the Gakona and Chestochena River valleys. They are probably the poorest Indians in the valley. Two families of this tribe live in the vicinity of Lake Mentasta. The Tazlenas and Gakonas are remnants of what were known to the the Russians as the Upper River Indians, or Colcharnies.

THE KLUTENA INDIANS.

Below the mouth of the Klutena we come into the district of a subchief by the name of Stickman, or Stickwan, who has a following of some 35 Indians. His district extends from the mouth of the Klutena to a small creek a few miles above the mouth of the Chettyna, and thence westward to the Coast Range of mountains, taking in the Archer River Basin.

THE CHETTYNA INDIANS.

Adjoining the territory of Stickwan on the south is the country of the notorious Nicolai, chief of the Chettynas, whom the Russians in their palmiest days could not subjugate, owing to the rugged mountain canyons into which he could retire when they attempted to attack him. He and his people are accomplished hunters and fishermen.

Early in the season, while at Port Valdez, I employed a squaw by the name of Omelia to act as interpreter. She had been left on the Valdez Glacier during a blizzard by her people, who were on their way to the interior after having finished their fall trading, and who was rescued by some squaw men, with whom she lived for a number of years, thus learning in an imperfect manner the English language. With her assistance I did fairly well in collecting data from the Indians and in impressing upon them our good intentions in opening up their country, until, on the occasion of some celebration, this squaw was for the first time in her life given some whisky, and, like some of her fairer sisters, being tempted, she listened to the tempter and fell to rise no more. From that day forth I was unable to control her when there was whisky in camp.

During the month of September I employed 10 of the Copper River Indians as scouts, not with the idea that they would actually perform the duty of scouts, but with the idea simply of identifying them with the white people who were entering their country for the first time with a view to permanent location. As an act of charity, I issued them clothing, as it was quite plain to the casual observer that the immigration of so many white people into the Copper River Valley meant the driving out of the greater part of the large game, on which they depend entirely for their supply of food and clothing during the winter. I also impressed on Stickwan and Nicolai the fact that if they would come to the coast when their supply of food ran short in the winter they would be given rations, and, if necessary, clothing, provided they did not molest the white miners who were in the Copper River Valley.

GENERAL CHARACTER OF THESE INDIANS.

It will be found to be the universal verdict of all who have come in contact with the Copper River Indians that they are honest, inclined to be friendly, and temperate. During the last season it was no uncommon sight to see these Indians wading out into the river and rescuing the supplies of some miner whose boat had been wrecked farther upstream. Piling them up on shore, they would go 3 or 4 miles out of their way to notify the owner where he could find them. Of the taste of whisky they were totally ignorant, their strongest beverage being black tea.

What will be the fate of these poor Indians in the next two or three years it would be hard to forecast. Yet, while they are few in number, the topography of the country is such that

should they resent the wrongs that naturally follow from the contact of the white man with the Indian, the little band of Nicolai's following on the Chettyna could in one season, if so disposed, retard the development of this section of Alaska (which has gone forward with such rapidity during the last year) for years to come.

In this connection I beg to recommend the employment of these Indians as scouts during the summer season, even though they render no military service whatever, as I believe it would be a move in the interest of economy.

AGRICULTURAL RESOURCES OF THE COPPER RIVER DISTRICT.

The soils of this valley are largely of vegetable origin, and where the natural formation admits of anything like a reasonable drainage the ground is thawed out and dried to a considerable depth. This is more particularly the case where there is a southern exposure. The depth of the soil varies from 3 to 8 feet. In selecting soil for agricultural purposes, in addition to the grade of the slope there must be taken into consideration the underlying strata. If these are of glacial clay, impervious to seepage of water, the foundation for the top soil will be cold and soggy; the sun will be unable to warm the top soil, and the results will be unsatisfactory. If land having the proper surface drainage and with a stratum of gravel underneath is chosen, the subdrainage will carry off the surplus water, the sun will warm the top soil, and plant life will thrive. I believe the possibilities of the development of an agricultural industry in the Copper River Valley to be conditional only on a market for the product of the small farmer. I embody the report of Mr. Jacob Sittell, a landscape gardener, who formerly resided in Portland, Oreg., as follows:

COPPER CENTER, *August 30, 1898.*

I reached Copper Center about June 4 and started in on a little garden. By July I had three kinds of lettuce and radishes big enough to eat, and now, the last of August, have onions, peas, beets, carrots, and turnips ready for the table. I could find a ready market for them, but shall keep them for my own use as a precaution against scurvy. If it does not freeze before October, I shall have cabbage, German kohl, corn, and beans. I did not plant any potatoes, as I did not have any seed, but I have seen some very fine new potatoes here, and I think if a man took time and trouble he could raise anything in the line of vegetables. If I could have started my garden by the last of April I would have had a fine showing by now. Even as it is I have nothing to complain of.

There are two kinds of wild currants here—the red (*Ribes rubrum*) and black (*R. laciflorum*). The former are very plentiful, and you could not tell them from tame currants; they are as large and fine. In places a man can pick 10 gallons in a day. The black are not so plentiful. They are sweet, and the bears are fond of them. Then there is the dewberry (*Rubus chamatmorus*). The plant, seed, and blossom resemble the strawberry, but there is but one berry to each plant, though that is large and fine. One finds this berry in swamps. There is a kind of moss—*Empetrum nigrum*—that has a black berry—crowberry—which resembles the wild cherry in size; but the berry is much sweeter than the cherry, and the frost does not seem to affect them, for I found them when I came, and they had stood the winter all right. We also have the blueberry (*Vaccinium uliginosum*), which grows on a small plant 10 inches high and mostly in swamps. They have a fine flavor and make good pies. There are any number of cranberries (*Vaccinium vitis idæa*), some of them of great size. We have, too, a red berry about the size of a currant, probably *Viburnum panciflorum*, which is very bitter and grows on bushes 2 feet high. I asked an Indian the name of them, and he said "bear-eat-em berry." There are other berries here that I do not know the names of, but, as a rule, they are good to eat.

There are two kinds of wild roses here, the dark red, which is like the jacqueminot, and the lighter red, like the La France. The dark one is in full bloom about the 1st of July, but the petals soon drop off, when an apple forms about 1 inch long by five-eighths inch through. It has very large seeds and its taste is like that of the pear. This same description will apply to the light red rose. There is a handsome, bright blue flower, *Lysenius nootcatensis*, which resembles the Laffgoba, or German stocks. The leaves are like the clover leaf, only a little longer, and are seven in number. They are in bloom about three months of the year. We have a beautiful, yellow marguerite, probably a species of arnica, whose bloom is as large as a half dollar and the leaf about 4 inches long by 1 wide. There is also the red, white, and pink pioneer de flaks—fire weed—*Ipilobrium augustifolium*, that springs up after the moss and underbrush have been burned away and grows to a height of 2½ or 3 feet, and are covered with flowers from top to bottom, and there are acres and acres of them. We have Myosotes, and blue and white violets, and one can find twenty-five varieties of flowers, such as bluebells, white begonias, lilies, etc., in bloom at the same time. There is a flower like the crocus, but larger, the stem resembling that of the tulip, only seedling; in color blue and white. They peep up as soon as the snow disappears and in three or four weeks there are leaves several times as large as the clover leaf. The handsomest plant of all is a white azalea, that grows in about 2 feet of moss, to the height of 2 feet, covered with blossoms from top to bottom.

Opposite the mouth of the Sanford River, Mr. Nelse Johnston and Mr. J. A. Otterness planted a garden on the 3d day of June with peas, turnips, radishes, onions, and lettuce. These

men arrived there late in May, and, having only hand sleds for transportation, decided to build a cabin and wait for the following winter. I passed their cabin September 27, and in their garden measured turnips 4 inches across, found peas well podded, with lettuce and onions too old to be used. Mr. Johnston, who was formerly a small farmer in Minnesota, assured me there were thousands of acres of land covering the well-drained slopes of Mounts Sandford and Drum that would certainly raise wheat, the conditions being about the same as those met with in northern Dakota and Minnesota. I saw along the trail, where scattering grains of oats and other cereals had fallen from the packs of horses, spears of those grains 3 or 4 feet high. The heads of these appeared to be fairly well filled out.

I also noticed where the fire had burned out the undergrowth that invariably a species of bunch-grass would spring up. I was told by the Indians that the first season after the ground was burned over the fireweed sprang up, followed the next season by the bunch-grass. While not vouching for the truth of this last statement, there are thousands and thousands of acres of the finest kind of bunch-grass in the Copper River Valley. This was always eagerly sought for by the animals of the pack train, and they would pick out that growing on soil having the best drainage, although it was not always the rankest growth.

TIMBER FOUND IN THE COPPER RIVER VALLEY.

The timber found in the Copper River Valley embraces the spruce, fir, hemlock, cottonwood, birch, alder, poplar, willow, sagebrush, and greasewood.

On the coast, above an altitude of 800 feet, is found a dense growth of alder. Where the soil is favorable there are found, lower down, cottonwood and Sitka spruce, with some scattering hemlock and cedar. Sitka spruce grows to a very large size here, reaching, I should think, a height of considerably over 100 feet, with large, powerful branches. It burns equally well green or dry, and is the best fuel for heating purposes found on the coast. The cottonwood grows in groves on the coast, and is soft and sappy at all times of the year, hence of little value for firewood. In the interior, beyond the rain belt, the alder does not thrive so well. Here is found, in addition to the timber of the coast, Norway spruce, birch, poplar, sagebrush, and greasewood. The Norway spruce, though not so large in diameter as the Sitka spruce, is very valuable as spar, mining, and railroad timber. It averages from 12 to 18 inches in diameter and some 75 to 80 feet in height. The growth is so thick that it is practically impossible to take a pack horse through it without cutting a trail. On the dry ridges in the vicinity of the Slahna River the white birch comes in to the exclusion of almost all other timber. It will average about 14 inches in diameter. There are some very large trees, however, found in sheltered places. The cottonwood is found in low, wet places, and does not attain the great size it reaches on the coast.

Forest fires have destroyed thousands of acres of this timber. They were originally started by the Indians to burn out the dense undergrowth, which enabled them to see the large game while hunting as it passed over these burnt districts. During the last season many of these fires have been started by careless campers, who would abandon a camp, leaving their fire smoldering in the dry moss. Fanned into a blaze by the first breeze, the fire would reach the edge of the timber. Here the branches usually grow close to the ground and deposit a little mound of petals of a highly inflammable nature, owing to the large percentage of resinous matter. The fire once reaching the timber, it would, in consequence, leap up the tree with lightning rapidity, throwing cinders a distance of some 300 or 400 yards. During the latter part of August the smoke was so dense in the valley that I was unable to see across it, a distance of some 45 miles. A forester in this section of Alaska could do much to suppress this wholesale destruction of valuable timber by thoughtless natives and miners.

INSECTS FOUND IN THE COPPER RIVER DISTRICT.

Insect life begins early in May, when butterflies and other winged creatures are observed flying over the surface of the melting snow. The sun at this season is very fierce and strong for about ten hours each day, hatching out the larvæ that were deposited under the broken rocks on the mountain side during the previous season.

Insect life is at its height late in June and early in July, when the mosquito is met in swarms. I have seen men, who had either lost or failed to provide themselves with head nets, scream with pain and fright when passing through a swale of high grass. The insects, rising in clouds, would crawl into their eyes, mouth, and nose, almost smothering them. I have also seen the same conditions at Fort Buford and other points on the Missouri River, so that I do not regard such an incident as peculiar to Alaska. It is generally believed that these insects begin to breed with rising water. I noticed, on the contrary, that the first flight is just after the water begins to fall. At that time the humid conditions are favorable to their propagation. During June and July one must expect to meet these pests in hordes when traveling in the low, wet grounds of the valleys. By climbing a mountain and pitching a tent upon a high rocky point one may escape them almost entirely. During the insect season all large game takes to the mountains and does not come down until the season has passed.

The following is an imperfect list of the insects noted along the trail by this expedition: The bumblebee, honeybee, wasp, moose fly, yellow fly, mosquito, gnat (small black and sand), ants, caterpillars, butterflies, spiders, grasshoppers, moths, and millers.

FISH FOUND IN STREAMS EMPTYING INTO THE COPPER RIVER.

The fish incident to the streams tributary to the Copper River include all the salmon family, with the grayling. I refrain from entering into details, as the subject has been exhaustively treated. However, clear, bright water is not necessary for the propagation of the trout, grayling, and salmon. I found them in small lakes and streams stained almost black from moss or trees.

The salmon is one of the chief articles of food of the natives. The first run gets up the river along in the early part of July. This is the humpback and dog salmon, followed later on by the red salmon, which may be found in the clear-water tributaries as late as September 15.

BIRDS FOUND IN THE COPPER RIVER VALLEY.

Horned grebe—*Colymbus auritus.*
Loon—*Gavia imber.*
Black-throated loon—*Gavia arcticus.*
Red-throated loon—*Gavia lumme.*
Herring gull—*Larus argentatus smithsonianus.*
Arctic tern—*Sterna paradisea.*
Red-breasted merganser—*Merganser serrator.*
Mallard—*Anas boschas.*
Green-winged teal—*Nettion carolinensis.*
Blue-winged teal—*Querquedula discors.*
Canvasback—*Aythya vallisneria.*
Scaup duck—*Aythya marila nearctica.*
Golden-eye—*Clangula clangula americana.*
American scoter—*Oidemia americana.*
Little brown crane—*Crus canadensis.*
Wilson's snipe—*Gallinago delicata.*
Field plover—*Bartramia longicauda.*
Spotted sandpiper—*Actitis macularia.*
Canada grouse—*Canachites canadensis.*
Willow ptarmigan—*Lagopus lagopus.*
Rock ptarmigan—*Lagopus rupestris.*
Marsh hawk—*Circus hudsonius.*
Sharp-shinned hawk—*Accipiter velox.*
Golden eagle—*Aquila chrysaetos.*
Alaskan bald eagle—*Haliaetus leucocephalous alascanus.*
Osprey—*Pandion haliaetus carolinensis.*
Hawk owl—*Surnia ulula caparoch.*
Kingfisher—*Ceryle alcyon.*
Alaskan three-toed woodpecker—*Picoides americanus alascensis.*
Flicker—*Colaptes aurates.*
Rufous hummingbird—*Selasphorus rufus.*
Alaska jay—*Perisoreus canadensis fumifrons.*
Northern raven—*Corvus corax principalis.*
Rusty grackle—*Scolecophagus ferrugineus.*
Alaska pine grosbeak—*Pinicola enucleator alascensis.*
Crossbill—*Loxia curvirostra minor.*
White-winged crossbill—*Loxia leucoptera.*
Common redpoll—*Acanthis linaria.*
Hoary redpoll—*Acanthis hornemannii exilipes.*
Snow bunting—*Passarina nivalis.*
Alaska longspur—*Calcarius lapponicus alascensis.*
Gambel's sparrow—*Zonotrichia leucophrys gambeli.*
Western tree sparrow—*Spizella monticola ochracea.*
Slate-colored junco—*Junco hyemalis.*
Lincoln's sparrow—*Melospiza lincolni.*
Cliff swallow—*Petrochelidon lunifrons.*
White-bellied swallow—*Tachycinetta bicolor.*
Waxwing—*Ampelis garrulus.*
Butcher-bird—*Lanius borealis.*
Yellow-rumped warbler—*Dendroica coronata.*
Golden-crowned thrush—*Seiurus aurocapillus.*
Water thrush—*Seiurus noveboracensis.*
Chickadee—*Parus atricapillus septentrionalis.*
Gray-cheeked thrush—*Turdus alicix.*
Dwarf thrush—*Turdus aonalaschkee.*
Robin—*Merula migratoria.*
Varied thrush—*Hesperocichla nævia.*

MAMMALS FOUND IN COPPER RIVER VALLEY.

Moose—*Alces americanus* Jardine.
Caribou—*Rangifer caribou* (Gmelin).
Mountain sheep; bighorn—*Ovis dalli* (Nelson).
Mountain goat—*Oreamnos montanus* (Ord).
Great brown bear—*Ursus* (*dalli* Merriam)?
Brown bear—*Ursus.*
Black bear—*Ursus americanus* (Gmelin).
Silver-tip bear—*Ursus horribilis alascensis* (Merr.).
Blue glacier bear—*Ursus emmonsi* (Dall).
Yellow bear—*Ursus.*
Black or silver fox—*Vulpes pennsylvanicus* (Boddaert).
Arctic fox—*Vulpes lagopus* (Linn.).
Beaver—*Castor canadensis* (Kuhl.).
Marten—*Mustela.*
Mink—*Lutreola.*
Muskrat—*Fiber zibethicus* (Gmelin).
Whistling marmot—*Arctomys caligatus* (Eschscholtz).
Porcupine—*Erethizon.*
Gopher, or ground squirrel—*Spermophilus erythrogluteius* (Richardson).

RAILROAD ROUTES AND ROUTES OF TRAVEL FROM PORT VALDEZ TO THE TANANA AND FORTY-MILE DISTRICTS IN ALASKA.

The map of Alaska shows only two lines of travel into that section of the interior, both confined to the main artery of drainage, the Yukon River. The southern route from Seattle to the Klondike, or Dawson City, is by rail from Skagway, at the head of Lynn Canal, over the White Pass, to the headwaters of the Yukon, which rise in a series of lakes in a flat, marshy country. Through this region the construction of a railroad will be a difficult problem. At present prospectors take a line of steamers at these lakes, pass through them into Lewis River; thence proceed down to the junction of the Lewis and Pelly rivers, where originates the Yukon. Going down the Yukon, the Klondike region is entered and Dawson City is reached, at a distance of about 575 miles from the coast. As a means of water transportation this route is available for only about four months of the year. The northern route from Seattle is entirely by water, and from St. Michaels, at the mouth of the Yukon it follows that stream in a northeasterly direction to Fort Yukon. Here, at the mouth of the Porcupine River, it turns and follows a southeasterly course to Dawson City.

With Skagway at the head of the Lynn Canal, Fort Yukon at the mouth of the Porcupine, and St. Michaels at the mouth of the Yukon, it will be observed that this river forms the arc of a circle. Of this arc Port Valdez, on Prince William Sound, is the axis. To put it more plainly, consider the arc of the circle as a portion of the felly of a wheel, with Port Valdez as the hub. Strange as it may appear, in making this great curve the Yukon parallels almost the trend of the coast line at a distance of some 500 miles from the sea.

Comparing the mileage between St. Michaels and Dawson City, which is 1,600 miles, and that from Skagway to Dawson City, which is 575 miles, we find the Skagway route to be 1,025 miles the shorter. Comparing the distance from Skagway to Dawson City, 575 miles, with that from Port Valdez to Dawson City, 400 miles, we find the difference to be 175 miles in favor of the Valdez route. It is apparent from these figures there are but two routes of communication to be considered, the Skagway and Valdez routes. Disregarding the fact that the Skagway route passes through foreign territory and involves taxation, with the usual formalities, it will be found that, topographically, the Lynn Canal and Port Valdez routes are about the same, with a difference in elevation of the White Pass on the Skagway route and the Thomson Pass on the Valdez route of something like 1,000 feet in favor of the Thomson Pass. The meteorological conditions are about the same.

I think there can be no comparison of the agricultural possibilities. I am profoundly of the opinion that the Copper River Valley will produce all the cereals, garden truck, small fruits, etc., that will be required by the mining population which may hereafter inhabit the Copper River, Tanana, and Forty-Mile districts of Alaska.

The gradient into the interior for railroad construction is practically nominal. Bridge timber, timber for railroad ties, coal, and iron, I believe, will be found in abundance. I did not understand that I was directed to make a preliminary report on the route for a railroad, but simply to report whether the topographical features of the terrain are such as to render the construction of a road practicable. Not only do I regard it possible, but believe it to be a com-

mercial proposition of great merit. All the natural routes (gradients considered), are confined to the Keystone Pass at starting for passage through the Coast Range of mountains. Having passed this range to a point in rear of Corbin Pass, there are three possible routes. These are up Lowe River, through the Keystone Pass, to the head waters of the Tasnuna, thence down that river to its junction with the Copper, a distance of 49 miles from tide water; second, up the Heiden Valley to the Kotsena Divide, down the Kotsena to its junction with the Copper, 93 miles from tide water, and, third, up the Heiden Valley and over the Thomson Pass, thence into the Copper River Valley.

Having reached the Copper River Valley, it is possible to proceed in any direction, the deposits of iron and coal dictating the course of the preliminary line.

SITES FOR MILITARY POSTS AND OUTLYING STATIONS.

The abrupt environment of the topography of Port Valdez leaves but one site which I could recommend for consideration as a military reservation. It is located on the south side of Port Valdez, some 6 miles from the head of the bay. Here there is a small plateau containing some 800 acres of land. The overhanging cliffs inclose what is locally known as Solomons Basin, at the head of which is a large glacier. The stream from this glacier would afford an abundance of water for the garrison. An abundance of spruce wood grows on the mountain side. One of the principal attractions of this place is the anchorage, the beach being shelving, yet not so abrupt as to preclude good holding ground.

As a second choice I report upon, but do not recommend, the site chosen in 1898 for my permanent camp. At first this would impress the visitor as the best location, as there is a broad plateau, some 6 or 8 miles broad and 3 miles deep, which presents a gentle gradient of about 200 feet to the mile, in full view. Cottonwood timber is plentiful. An unobstructed view of 5 or 6 miles of trail can be had. These are all of its recommendations. The objectionable features are the great depth of water and the absence of holding ground for the anchorage of shipping. The prevailing wind is up or down bay. During the summers the entire plain is flooded with glacial streams. This permanent camp was used by me as the base from which to compute all distances in the interior.

Passing the Keystone Pass, I suggest the location of a relay station at the foot of Thomson Pass, about a day's drive, 20 miles, from Valdez, at the eastern end of Corbin Pass.

Crossing over Thomson Pass, down the Archer River Valley, over the Quartz Creek Divide, and down that stream to the point where the Klutena leaves Lake Abercrombie, I recommend the location of a substation. From such a substation assistance can be rendered prospectors in the Klutena Valley and to those operating in the Archer River Valley. Here there are hay meadows and ground susceptible of cultivation.

Following the Klutena to its mouth and crossing the Copper is found the third point recommended by me for a substation. This is the intermediate point between the Indians from Lake Tazlena and those on the Copper, between whom there has been friction in the past. It is also the point of departure for those crossing the big bend of the Copper, and forms a supply point for the relay stations farther to the west. Twenty miles farther on, in the plateau of the big bend of the Copper, is found a valley and a lake. Fuel, grass, and shelter from storms recommend this as a place for a relay station.

Crossing the plateau of Mount Sanford, a point in the Bowlder Creek Valley is reached, from which point is exhibited the character of this plateau, with Mount Sanford in the distance. Here I think a relay station should be located.

The natural site for the upper substation in the Copper River Valley is found under a high gravel bank on the west side of the Slahna, at its junction with the Copper. This is reached by crossing Bowlder Creek and passing thence to the ford on the Copper just above the mouth of the Slahna. Here all the requisites of wood, water, and grass may be had in abundance.

The last substation I recommend is reached by passing up the Slahna to Mentasta Pass.

Here fuel and forage may be gathered in summer for winter use. I also recommend the establishment of a military telephone line to connect this system of stations.

At each substation I suggest the stationing of four enlisted men, two Indian scouts, and a noncommissioned officer, supplied with four pack ponies, a supply of relief stores, and the latest maps of the region. The relay stations, I think, should be garrisoned by two enlisted men and one Indian scout, with two pack ponies, supplies, and maps. This system of relay stations, in my opinion, would eliminate the sensational stories which, owing to the lack of reliable information from the interior, are now eagerly sought for and published. It is a modification of the system of one-company posts pursued in former years during the settlement of Colorado, Montana, Dakota, and the other Western States.

For this duty only picked men should be detailed, who are naturally fond of frontier service. I also call attention to the methods employed by the mounted police of the Northwest Territory in their enlistment.

THE COPPER RIVER MINING EXCITEMENT OF 1898.

My first information of the auriferous deposits in the Yukon Valley was obtained from the Sheflin brothers, who, having been made wealthy by the discovery of valuable mining properties in the Tombstone district, Arizona, decided to gratify that fever ever present in the brain of a successful prospector, to find some "new camp," and explore the Yukon Valley in Alaska. They proceeded to St. Michaels, at the mouth of the Yukon, with a little stern-wheel steamer in sections. Putting together their boat, the *New Racket*, they set out in the spring of 1883, with a two-years' supply of everything money could buy, and proceeded up the Yukon to the mouth of the Stewart, where they found their first pay dirt of any value.

The following year I was sent to Prince William Sound to find a trail somewhere in the vicinity of the Copper River, which had been reported by Russians as leading into the interior. On returning from this duty, in the winter of 1884, I met a prospector by the name of McKonkey, who had spent the previous winter in prospecting the Yukon River. From this man I gained the impression that flour gold existed from the mouth of the Tanana to the lakes at the head of the Yukon. Owing to the shortness of the seasons, the crude means of transportation, and the ordinary means of placer mining being inadequate, there had been no paying discoveries made. From year to year these reports came from the Yukon Valley with perplexing variations. While the professional miner was satisfied that placer deposits existed in the Yukon Valley, he was skeptical about advising the enormous investment necessary to successful work so far from the base of supplies. These fluctuating reports kept the mining world in a feverish condition. This condition was enhanced by the dying out of the excitement regarding the discoveries in South Africa and Australia. Hence, when the reports became verified by the shipment of gold dust, of a character peculiar to a new district, to the branch mint at Helena and to other mining centers, the mining fever became epidemic. The characters and conditions existing in California in the early fifties and in Montana in the late sixties were simply transferred to a more northern zone. Seattle, Dyea, and the Klondike were the three magic words which might be heard from morning until night. Steamers were crowded with fortune hunters, mail facilities congested, and the greater the confusion the more intense became the excitement. The prospector with $1,000 in gold dust upon his return to Seattle or San Francisco was amazed to find his name in the headlines of the newspapers, in which was announced the arrival of a Klondike millionaire.

Coming after years of stagnation in legitimate business pursuits, these announcements induced thousands to invest the savings of years. Cooperative syndicates were formed through which these investors sought to secure their share of the glittering gold they believed to be strewn along the river valleys of Alaska like pebbles on the shore of the ocean. Many of them crossed the Mississippi for the first time in their lives, and were wholly unacquainted with the customs and methods prevailing in the sparsely settled Western States. The first obstacle these adventurers encountered was the rules and regulations provided by the mounted police of the Northwest Territory of Canada for the collection of duties, etc. Written accounts were sent

back containing garbled accounts of these regulations, so that the friends at home considered the prospectors were being gulled by dishonest officials in a foreign country. As a matter of fact, a finer body of men never graced a uniform than these same mounted police.

Following on the heels of these reports came the more sensational one of starvation at Dawson and Circle City. Now began to be heard mentioned an "all-American route," over which a citizen of the United States could travel without paying tribute to a foreign nation. All available literature bearing on the routes of travel into the interior of Alaska over American territory were eagerly sought for. Of the many guidebooks placed on the market only a few were fairly reliable. These were purchased, read, and their statements accepted as facts by those wishing to evade the payment of duties through a foreign country. The natural result was a stampede of prospectors for the Copper River Valley route. As to whether there was a Copper River route or not, where it led, what it contained in the way of mineral, how the prospector was to find it, and how he would extract it when found, were questions too knotty to be considered by me. Apparently the main point in view was to be landed on the shores of Alaska. A rumor existed that the Russians had used a trail going into the interior from the head of Port Valdez, on Prince William Sound, to the new El Dorado, the Copper River Valley. Pamphlets of the various transportation companies, one of which existed on paper only, told them just how to go and what to take Secret expeditions were fitted out which chartered vessels and which in due course of time cleared for the port of Valdez. This was late in the fall of 1897.

In the winter of 1897–98 the Pacific Steam Whaling Company, which had previously conducted an extensive salmon-canning business, entered the market as a common carrier of passengers and freight. Its first passenger vessel, the *Valencia*, sailed north in February, 1898, with some 600 passengers, accompanied by horses, mules, burros, and dogs. In crossing the Fairweather the steamer encountered heavy weather, necessitating the shooting of most of the livestock. This sensational item further advertised this route. When I arrived with my expedition at Seattle, early in April, to embark on this same steamer *Valencia*, I found a heterogeneous mass of people that were willing to put up with any inconvenience and pay almost any price to secure passage for themselves and freight space for their outfit north. Arriving at Port Valdez, they found the people who had preceded them some 60 days strung out along the trail from the landing to the foot of Valdez Glacier. The prospectors who had failed to provide themselves with pack animals now began for the first time to consider a means of transportation for their outfit of provisions, etc., from the ship to the interior.

All were provided with hand sleds about 18 inches wide and 6 feet long, which were valuable only as a means of transportation so long as the snow lasted and the prospector remained in good health to supply the motive power. From the steamer to the shore, a stretch of some 300 yards of beach, these sleds were of course not available. To settle this important problem a miners' meeting was called with a view of inducing the company that had transported them thus far to place their outfit on shore above high-water mark. This knotty problem was still under consideration when I began to "back-pack" our outfit from the steamer over the beach to a cache on shore. Then these prospectors organized themselves into a commune and did likewise. Caching their entire outfit near the cache of the expedition led to considerable confusion, dissension, and bickering. Owing to the imperfect marking of the goods, there was a loss of many small packages. As parties would come nearly to blows, their grievances would be referred to some one of the "Government outfit," as the expedition was called.

Stringing out from the beach to the foot of the glacier, a distance of some 3½ miles, the prospectors commenced their journey to the Klutena Valley. They now began to realize for the first time the trials and hardships incident to the everyday life of those who ply their vocation on the frontier. They had neither the slightest idea regarding the topographical features of the country nor any definite plan of campaign as to their future movements. Where the leader wandered the balance followed. This was strikingly exemplified by the course of their trail, which led over the most difficult part of the glacier. As to how they should supply themselves with the two most necessary articles for camping, wood and water, they were utterly ignorant. Having climbed 8 or 10 miles of the glacier, the mountains on the side of which were

utterly devoid of timber, they were forced to climb down again to secure water for cooking and drinking purposes. To save themselves this trouble numbers of them lived for days on uncooked food, borrowing water from the "old-timer," who had provided himself with oil and a stove to burn it. They were soon so galled by the excessive labor required to draw their goods over the trail that it was with the utmost pain they continued their labors. The sun in the middle of the day, beating down with its northern fierceness, made them snow-blind by scores. This misfortune made those so affected unfit for work. The causes leading to snow-blindness were rarely considered by the partner. When the afflicted man could not do his share of the work separations followed. Friends of years' standing became the most bitter of enemies. It was no uncommon sight to see an organization stopping on the trail to dissolve partnership. When one considers the unexpected hardships these men had to face in their realization of the fact that gold dust did not line every river bottom, and that one in a hundred is a large percentage of successful prospectors in a mining stampede, it is not strange that a bitter feeling of resentment, no matter how unjust, should manifest itself. When members of the expedition were called upon in cases of this kind they did their best to divide the property as equitably as possible. Out of hundreds of cooperative companies that left Seattle, I think less than a dozen reached the interior of Alaska as an organization.

Beyond the glacier, the first point of any importance in the Klutena Valley located by the prospectors was known on the trail as the "Twelve-Mile Camp," which is 31½ miles from Valdez. Here the prospector found timber out of which to whipsaw material to build his boat. Innumerable styles and models of craft were used, and as a result the river banks were strewn with wrecks. That there were not more casualties from drowning is remarkable.

After passing through Lake Archer, the next congested point was at the foot of the lake, 75 miles distant from Valdez. Here starts the Klutena River, with a gentle, smoothly-flowing current, which prevails for some 3 miles. Then the gradient increases to such an extent that from Amys Landing to Copper Center, 21 miles, where the Klutena debouches into the Copper River, is one succession of rapids. On the drift piles in the center of the river I noticed, while traveling the trail along the river bank, parts of boats, all kinds of provisions, clothing, etc., that had been washed down and lodged there from wrecks. These their owners were unable to recover, owing to the terrific current.

Copper Center, 99¾ miles from Valdez, on October 26, 1898, contained probably forty or fifty cabins. These would possibly average four persons to the cabin. From this point the prospector without pack animals must transport his outfit by boat. The boat, usually of the bateau order—a long, narrow craft, sharp at both ends—would have lashed to its bow a long, slim spruce sapling, and with a bowline some 70 to 80 feet long. When the boat was loaded and ready for the journey, one member of the party, who excelled in agility and ability to clamber over the bowlders with which the river bank and bottom is lined, would take the pole in hand. The remainder of the "outfit" would seize the towline. The duty of the man with the pole was to always keep control of the boat, prevent the bow from striking against bowlders in the river and the boat from taking a sheer as it came out of an eddy into the swift current. Those on the towline supplied the motive power for pulling the boat upstream. This method is known in the vernacular as "lining her up" or "dropping her down" stream. From Copper Center there are two trails, or routes, indistinct, and at places not marked at all except by small sticks used by the Indians to indicate a general direction, passing through the Copper River Valley. These lead to Mentasta Pass, which is the objective point for the Yukon, Tanana, and Forty-Mile districts.

The Millard trail, 22 miles the shorter, crosses the Copper River and, skirting the base of Mounts Drum and Sanford, takes the high ground of the big bend of the Copper; thence it follows an old Indian trail, and then strikes that river again at the south of the Slahna River, a distance from Port Valdez of 177½ miles and from Copper Center 55½ miles. The more northerly route follows the course of the Copper River, on its northern bank. This crosses the Tazlena River 8½ miles from Copper Center. Here there is another small settlement of probably ten or twelve cabins, built mostly by prospectors who have spent the summer on Tazlena Lake and the

head waters of its tributaries. Thirty-six and one-half miles from Copper Center I found another cabin, opposite the mouth of the Sanford River. Seventy-seven miles from Copper settlement is another small settlement, at the mouth of the Slahna. From this point there is practically no trail for a distance of 26 miles, as most of the prospectors have boated up the Slahna to Lake Mentasta. Here the last of the series of cabins built by the prospectors who entered the Copper River Valley during the season of 1898 was built. This is in Mentasta Pass, in the gateway to the Yukon, Tanana, and Forty-Mile valleys.

It will be observed that these settlements afford a continuous line of habitations from the coast on Prince William Sound to the Forty-Mile district in the interior. The supply of food in the Copper River Valley I regarded as ample for the winter and part of the season of 1899. Flour, that barometer of mining camps which indicates prosperity or failure, fluctuated in price from $1.50 per sack in the early part of June to $9 per sack in the latter part of September, when some placer streams were reported in the Tonsena Valley.

After getting into the interior and finding the maps and guidebooks purchased from "fakirs" in the States to be wholly unreliable, two-thirds of those who had successfully surmounted the glacier going in, now became apprehensive lest their retreat over the glacier should be cut off by the melting snow. With the snow arches over the crevasses destroyed these adventurous spirits would be compelled to spend the winter in the interior. As the expedition passed over the glacier in the interior, with their pack train of twenty-three animals, early in August, it was no uncommon sight to meet these people, thoroughly demoralized, coming out in squads of tens and twenties. They cursed the transportation companies liberally, but more particularly the commander of the "Government outfit," for not sending men into the interior ahead of them to cut trails and mark out routes over which they might travel to prospect the country. My belief is there were not more than 10 per cent of the 3,500 people who crossed the summit of Bates Pass during March, April, May, and June who did not firmly believe they could pan out a fortune and return to their homes in time to eat their Christmas dinner. Hence their disappointment was bitter in the extreme, but not more so than in other mining stampedes of the last twenty years. The arrival of the expedition with the pack train at Copper Center effectually checked the stampede by giving a practical demonstration that where a pack train could go man could also travel with safety. The most frequent complaint met with by the expedition was that of individuals who had failed to get their mail, which they had expected the "Government outfit" to bring in.

The postmaster at Orca found it impossible early in the spring of 1898 to make arrangements with any of the prospectors to pack mail from Port Valdez into the interior. Hence he made arrangements with what is known on the frontier as a "squaw man"—that is, a white man who had married an Indian and to all intents and purposes had become one of them. This man, Jackson, proved to be a very satisfactory carrier during the earlier part of the season, but, like others of more brain power, he could not stand prosperity, and fell by the wayside. From this time on there were various mail carriers. These, as they accumulated money enough to pay their passage south to the States, abandoned the mail, which in this way became scattered along the trail, to the utter disgust of the people as well as that of the postmaster. The latter afterwards had this mail collected and returned to Orca. All this could have been avoided had a postmaster been appointed at Copper Center and a paid carrier employed to deliver it at that point. Later in the season a post-office was established at Port Valdez, but, no provision being made for the delivery of mail there, the mail for the interior continued to be delivered at Orca, on Prince William Sound, the terminal of the mail route for that district, and there it remained unless carried farther by private enterprise. This so disgusted the newly appointed postmaster at Valdez that he returned to the States, leaving matters in a very unsatisfactory condition relative to the delivery of mail to prospectors in the interior.

While the majority of the prospectors was crossing the Valdez Glacier, some two or three hundred others attempted to ascend the Copper River from its mouth and prospect what is known as the Chettyna district. The impression left of this route is of a negative character, owing to the fact that the rapids in Abercrombie Canyon are impassable, if no other impediment existed in the lower river to bar navigation below the mouth of the Bremner River. Here was estab-

lished a small settlement of ten or twelve cabins of prospectors, who had ascended the Bremner River for quite a distance and had attempted to ascend the Chettyna. They were, however, unable to make more than a flying trip over the western edge of this district, owing to the swiftness of the current and the rugged character of the country through which it flows.

The expenditure of time and money by the people of the United States in the Copper River district in attempting to establish an "all-American route" in the unexplored sections of the interior of Alaska, may be estimated at $3,700,000. This voluntary contribution on the part of the people has located and imperfectly marked, with the exception of an interval of some 35 miles, the most practicable route for opening up to settlement the remnant of our frontier, in the development of which it has been the uniform policy of the War Department to go hand and hand, as it were, with the pioneer.

In conclusion, I recommend some action looking to the completion of the work begun last February by the pioneers now in the Copper River Valley, by the construction of a trail through the Keystone Pass of the Coast range of mountains, from the head of Port Valdez, Prince William Sound, to Thomson Pass, at the head of the Tonsena Valley, a distance of about 35 miles, and I only echo the united sentiment of these people that Congress ought to assist them.

THE ORGANIZATION OF AN EXPEDITION.

This, in my opinion, should be left entirely to the officer selected to conduct the explorations, for the reason that, if he is ambitious, his one aim will be success, and with that in view he will select only such material as will result in his expedition gathering the greatest amount of information and consolidating it in the most desirable form for presentation to his superior.

Only such enlisted men as are desirous of assuming the excessive labor and hardship incident to duty of this character should be detailed. The equipment of the expedition, the component parts of the ration, the form in which the packages should be prepared for shipment, and, in fact, all minor details, which means success or failure to an expedition of this character, and which only experience teaches to the operator, should be vested solely in the officer conducting it. He should be given a suitable agent to take charge of his base of supplies and forward his rations, a clerk to prepare papers of accountability, collect the necessary data to cover the loss of public property, and render the necessary returns in due season.

This places the commander in a position where his mind is free from all care and worry incident to property accountability, and enables him to report on the data collected while such are still fresh in his mind. The flour portion of the ration should be increased from 18 to 22 ounces per diem. Fruit should be added as a component part of the ration; also saccharine tablets, as they are compact in form and less liable to damage from rain. It is desirable that the transit line of observations carried from Port Valdez to the mouth of the Klutena River be continued through to the head waters of the Tanana, thus forming a base line from which a point of departure can be taken for compass stretches up the various valleys and rivers tributary to this line. This transit work should be given to an expert. To explore the Chettyna district a small stern-wheel steamer is absolutely necessary, owing to the fact that the river is so filled with quicksand that it is almost certain death from drowning to attempt to make a horse swim it.

In view of the distress usually prevailing in unsuccessful mining districts, I beg to call attention to the advisability of keeping on hand constantly at the base of supplies a small quantity of relief supplies for destitute miners and others coming from the interior en route to their homes in the States.

A MILITARY TRAIL RECOMMENDED.

As previously reported by Capt. P. H. Ray and others, the greatest factor retarding the development of the interior of Alaska is the abnormally high price of food. There is but one way that I know of to meet this condition of affairs, and that is the construction of a military trail by the Government from Port Valdez, on Prince William Sound, through the Copper River Valley and into the heart of the mining section at the head of the Tanana River. This would give the prospector who owns two or three head of ponies an avenue by which he could reach

that section of Alaska which we believe to be mineral bearing. It will be an avenue of escape for the individual to whom the combination of conditions renders it necessary that he should return to the coast.

A military trail similar to that built through the Cœur d'Alene and Rocky Mountains in the early days of Bonneville and Mullen could, with an expenditure of $35,000 be built into the Yukon Valley. The distribution of this amount of money would enable the prospector who should be employed in constructing this trail to earn enough to either return to his home in the States or continue the development of his prospects.

THE PERSONNEL OF AN EXPEDITION.

The personnel of an expedition to construct a military trail from Port Valdez to the interior should consist of 1 competent clerk, 2 topographical assistants, 2 geologists, 1 expert on the agricultural products of the country, 4 miners for blasting trail through rock cuts, 16 axmen, 2 cooks, 8 packers, 2 noncommissioned officers and 8 privates as a guard on public property, 15 Indian scouts, one of whom should be rated as a sergeant. These scouts should be employed more as a safeguard against an Indian outbreak than as actual scouts, from whom, in consequence, routine garrison or camp duty should not be required.

The enlisted men of the expedition should, in addition to their regular equipment, be supplied with snow packs, leather-topped rubber boots, Kenwood sleeping bags, rubber boots, slickers, sou'westers, mosquito masks, and German socks.

ANIMALS BEST ADAPTED TO USE.

The animals used by the Government expedition and by the prospectors going into the Copper River Valley consisted of horses, both range and stall fed, mules, burros, and dogs, and of this collection the animal that gave the best service was the range pony which had been reared in the cold, mountainous country of Montana, northern Idaho, and Washington.

It was found that the stall-fed animal could not stand the cold blizzards and the rain. Most of them got pneumonia and died along the trail. The burros did not do well in the soft snow, and were worse than no transportation at all in crossing the cold, glacial streams. The dogs gave by far the best service on the crust of the snow, but their sphere of usefulness was practically limited to this mode of travel. During the summer months they were practically valueless, and their keep was quite an item of expense to the prospector.

The range pony best adapted to this service is what is known on the market as a "chunk," weighing about 800 to 1,000 pounds. He must have a small head, be broad between the eyes, have a slightly roman nose; short neck; deep, broad chest; short, heavy-muscled legs; big barrel; close coupled, big hams, and with all four feet well under his body. Sorrel and buckskin are the best colors.

He should be provided with a McClellan combination pack and riding saddle, with breast strap and breeching attached; a good blanket and sweat cloth to go under the saddle, and a light paraffined paulin to be thrown over the pack before the final cinching during the day, which is to be used in covering the cargo during the night. It will be found that the hair cinch, while a little more expensive, is far more serviceable than the canvas cinch, which latter grows hard and stiff with constant wetting in fording streams and which galls the animal under the fore leg. The range pony having a thicker coat of hair than the stall-fed horse, stands the attack of the mosquitoes and flies far better. Should it occur that the flies and mosquitoes bite him to such an extent as to make his chest and the region about his ears raw, the application of bacon grease to these parts after a day's drive and the building of a smudge will in a short time heal up his sores.

It was found in comparing the range pony and the mule that the pony would pick his way through stretches of boggy country with less liability to mire down; that he could climb the glaciers and steep canyon sides where the mule would turn and go back, and that he would eat snow to quench his thirst when the streams were all frozen, which the mule would not do. When the country becomes cut up with trails which are well packed down by travel, the pony can not

compete with the mule, from the fact that the mule will carry a far larger load and is more tractable in a large train. But for the purpose of prospecting, the trained pack pony is invaluable to the prospector and the best means of transportation he can take to Alaska.

In preparing an outfit all packages should be double-sacked, in 50-pound packages. The first sack should be of paraffined canvas and the second of unparffined canvas. While this adds to the first cost of the goods, the additional amount of supplies that reaches the interior in good condition, owing to the double sacking, more than repays for the original outlay. The packer's outfit, properly provided, should consist of a blanket sleeping bag with canvas cover, a blanket-lined canvas coat and trousers, a pair of rubber hip boots, snow packs, German socks, high-topped shoes, heavy woolen gloves, a slicker, a head net with mask, one change of heavy woolen underclothing, and an amply supply of woolen socks. In regard to the last article, he should be extremely particular in making frequent changes, as a failure to do so results in frozen feet. The usual camp outfit of cooking utensils will meet the requirements of the trail.

FROM VALDEZ INLET TO BELLE ISLE, ON THE YUKON.

By Lieut. P. G. LOWE, Eighteenth Infantry, U. S. A.

I made three attempts to ascend the Valdez Glacier before I succeeded. The first attempt was made on July 8, 1898; the second July 10, the same year, and the third on July 13, 1898. Accompanying me were 11 picked horses, some extra horses, and 3 pack mules. Every horse carried 150 pounds and each man led one horse. We carried with us a sectional bridge, which we subsequently were compelled to abandon. The glacier is a fairly gradual ascent, except in one short, steep place near the summit, and its general direction is north and south. The summit is 4,650 feet in elevation and I estimated the mountains on either side of the glacier at 6,000 or 7,000 feet. The south slope of the glacier is 20 miles long, and the north slope 9 miles from the summit. The last 3 or 4 miles of the ascent on the north side is along the edge of a moraine. At the foot of the glacier is a bold stream which flows from the latter. This stream is called the Klutena River. It heads at the north foot of Valdez Glacier at an elevation of 2,300 feet. We made 21 miles over a difficult trail in nine hours. Up to the time I made the distance it was the quickest time on record where horses had been used; footmen have made it in less time.

On July 17 we reached Twelve Mile. We found at this point about 300 people in tents, waiting for the Klutena to go down so that it would make boating safe. Several thousand prospectors had pulled their supplies over the glacier during the spring, using horses, mules, burros, and dogs. Many supplies were drawn over the glacier on a handsled. A majority of the prospectors was sprinkled along the Klutena within 12 miles of the glacier, where members of the expedition whipsawed lumber and built boats of all sorts and sizes. Several people were drowned in attempting to boat the rapid stream. The valley at this point is half a mile wide, with picturesque mountains on either side. I found plenty of moose and bear in the country. Before the prospectors had driven them away there had been plenty of beavers. Muskrats were found in every available water hole between the point named and the Tanana River.

After several failures, the expedition succeeded in fording Stephens Creek. I found myself in the Klutena Valley on July 23, and on July 26 I crossed Canyon Creek where it empties into the southwestern point of a large lake. The lake is 25 miles in length and between 3 and 4 miles in width. The Klutena flows into it at its southeastern point, and out of it at its northern end. The water of the lake is clear and deep, and its head is 1,700 feet high. On July 30 we reached Amys Landing. At this time there were 300 people at the landing. On July 31 we reached Copper Center. At the date we arrived this place was a large village of tents and cabins. Copper Center is a sort of interior starting point, the objective appearing to be the head waters of the Copper and the Tanana. I met not less than 200 returning prospectors between Valdez

Glacier and Copper Center. The general direction from Valdez to Copper Center is magnetic north, and the variation of the needle from Valdez to Forty Mile is from 30° to 34°.

On August 6 we found ourselves on the left bank of the Sanford River, 29 miles from Copper Center. The Sanford is considered one of the worst streams in the Copper River country. After several unsuccessful attempts we finally crossed the Sanford and proceeded to Bowlder Creek, and on August 21 we camped on the banks of the Slahna, 16 miles from its mouth. On August 21 the expedition crossed the Slahna and reached the place called "John's House," on Mentasta Creek.

On August 26 we reached the summit of Meiklejohn Pass. From this point we could see Mount Thomas rising several hundred feet on the right, and on the left a deep canyon and high mountains. Here we halted to view the great Tanana Valley, which could be seen in the distance. On August 28 we followed the Tetling River. In due time we reached the Tanana.

Our objective point now was the Yukon. On leaving the Tanana we entered a country that, up to that time, had not been mapped from actual observation. All the information obtained in relation to it was gotten from the Indians. On September 5 we reached Dennisons Fork of Forty Mile. Since leaving the Tanana we had encountered only low mountains, but they were now getting higher rapidly. The Forty Mile tributary, the north side of which was being followed up, has high mountains on both sides and flows through a valley between 1 and 2 miles wide. On September 8 we dropped down about 1,200 feet into a canyon opposite the head of the Forty Mile tributary. The elevation of the trail I estimated to be about 4,500 feet. The elevation of the camp finally made was 3,150 feet. As far as I could calculate we were at the head of Walkers Fork. On September 12 I determined to make a break for Forty Mile. After traveling several days we reached Millers Creek. We followed Millers Creek, on September 19, to the head of Glacier Creek, which stream runs parallel to Millers Creek and empties into Sixty Mile.

Our next objective point was Moose Creek. By this time several of our horses had given out. On September 20 the expedition climbed the high point of a mountain, from which we descended very rapidly and entered United States territory. This day we camped at the mouth of Moose Creek. I rigged a small pole and hoisted the American flag for the first time. Almost immediately a faint cheer came from a tent on the opposite bank, and up went a little flag that appeared at the distance to be no larger than a postage stamp.

The mouth of Moose Creek is 26 miles from the Yukon, with an elevation of 1,800 feet. The 26 miles of Forty Mile River are a stretch of tortuous canyon with picturesque sloping sides. The horses of the expedition were practically in a pocket, as there was no trail either up or down the stream. To attempt Dawson or Forty Mile Post by the ordinary, or good, trails over the snow-covered divide would mean certain death to them. Under these conditions I decided to leave the animals with a member of the expedition named Stephan. I believed that he had a fighting chance to get some of the animals through the winter and subsequently get them to Forty Mile alive.

On September 21 a boat was purchased and the expedition went down the river, the first 3 miles being on American soil. We lined down one rapid, shot another, and landed at Forty Mile six hours after starting. Forty Mile is a large cabin village, with a trading store and warehouse, and is on the right bank of the river where it empties into the Yukon. Just across the stream is Fort Cudahy, a station of the mounted police. The Yukon is 300 yards wide, of good depth, and clear and swift.

It was too late to catch the last boat for St. Michael, and the expedition's only hope lay in getting up the Yukon. Seeing two boats land, which were pushing a barge at Fort Cudahy, the members of the expedition lost no time in tossing their outfit into a skiff and rowing down to them. American boats are not allowed to carry passengers from one Canadian port to another, but Lieutenant Scarth, of the mounted police, had given instructions that my detachment should be taken aboard. The boats were the *Governor Pingree* and *Philip B. Lowe*, and were pushing the barge New York, loaded with supplies for the Canadian troops at Fort Selkirk.

On September 26 the expedition landed at Dawson. On October 1 we reached Selkirk. On

October 13 we found ourselves a short distance above the mouth of the Hootalinqua, and on October 14 we reached White Horse Rapids. On October 16 the head of Lake Bennett was reached. On October 18 the expedition arrived at White Pass. After a walk of 20 miles the expedition boarded the narrow-gauge railroad and proceeded to Skagway.

ACROSS VALDEZ GLACIER.

By Lieut. R. M. BROOKFIELD, Second Infantry, U. S. A.

By way of introduction it should be stated that as it had been reported that there was a practicable summer route from Valdez to the Copper River over a glacier to the east, I was ordered to go over this glacier. This accomplished, I was expected to establish a camp on a lake which was said to be near the foot of the glacier on the other side. In pursuance to these instructions, I started on my expedition at 3 o'clock on the morning of May 21, with two enlisted men and several civilian packers. I reached the foot of the trail over the mountain in a little over an hour, a distance of 3½ miles. I took with me five sleds, carrying a load of 300 pounds each. At the foot of the mountain I found a small river, which caused me to consume nearly two hours in crossing. Here I was abandoned by all but three of the civilian packers, as it was found that the crust on the mountain would break through, even under a light load. I went forward with four sleds, loaded with 100 pounds each, and by 10 a. m. the two leading sleds had reached a point on the mountain 2½ miles from the foot. The altitude was found to be 750 feet. Here a cache was made, as it was found impossible to go farther. The mountain was yet covered with from 5 to 20 feet of snow, and as the crust softened travel became very difficult. On returning over the trail I found the other two sleds about halfway down, where they had been abandoned by the packers. That night I camped at the foot of the mountain. On account of the weather being warm and rainy, I decided to return to camp for instructions. The bad weather continued for several days. As the storm cleared on May 26, and colder weather made the formation of a crust probable, I again started with four enlisted men at 8.15 a. m.

My instructions now were to survey the trail as far as the summit of the glacier, and if possible to find out and report upon the character of the country on the other side of the divide. The foot of the mountain was reached at 10 p. m. At this point the trail leads over a level plateau for 3½ miles in a direction nearly east of the camp. At the base of the mountain were found several small encampments of prospectors who were waiting for the snow to leave before starting over the divide. Traveling on the mountain was again found to be difficult, and the cache was not reached until 3.10 a. m. on the 27th. Here the men breakfasted, and with Corporal Heiden and Private Gardner, of the Fourteenth Infantry, and Mr. Pope, I continued my journey. It was my intention to reach the summit of the pass, where it was expected that a comprehensive view could be had of the surrounding country. To provide against emergencies three days' provisions were taken, as well as the mens' rifles, while I carried only my instruments and a pair of snowshoes. After several hours of laborious tramping the summit of the pass was reached at noon. All through the morning the men traveled through a storm of rain and sleet, which afterwards changed to snow, and which finally effectually prevented me from seeing anything of the country. However, I decided to keep on until I could find wood and water. At the summit the barometer showed 6,450 feet, and the distance from the foot of the mountain was estimated to be 7 miles. From the summit the trail leads down the glacier by several steep slopes. The slope of the glacier itself was gradual in the upper stretches, and the snowshoes, which up to this time had been useless, were used to excellent advantage. Two large feeders of the main glacier join it from the right, and leave it at about 3 miles east of the summit. The one from the right is very precipitous, and is broken all the way up by perpendicular ledges of blue ice.

While coming up the mountain the soldiers shot a badger and a squirrel, and this game proved a very welcome addition to the limited fare of the party. A number of bear tracks were discovered, but no bear. The end of the glacier was reached at 8 o'clock that evening. Here

the men met with an obstacle that for the time seemed insurmountable. The glacier appeared to be suddenly chopped off between two high, precipitous mountains, which, beyond the limits of the glacier, formed a narrow gorge. No footholds could be obtained, and the descent was finally made through a large crevasse which existed near the right hand end of the glacier. The light baggage which accompanied the men was thrown down ahead of them, while the men slid down the steeper slopes, trusting that the snow which had accumulated in the crevasse was strong enough to bear them. The bottom was finally reached without mishap, after 700 or 800 feet of this kind of descent. The bottom of the gorge was filled with large bowlders, and a considerable stream ran through it from the rapidly melting snow on the glacier. The route followed was not practicable for any kind of travel, but a practicable route is said to exist about a mile and a half from the foot of the glacier.

Following the glacial stream through the gorge, the expedition soon came to a wooded valley about 4 miles long and three-quarters of a mile wide, running northeast, and inclosed by high mountains. No lake was visible, and instead of finding the stream in the valley running east or northeast toward the Copper River, it was found running to the south, thus leading to the conclusion that the divide had not been crossed, and that the large stream flowing through the valley was but a continuation of the river flowing into Port Valdez at its southeastern extremity. Camp was not established until 2 a. m., and the men had been 43 hours without sleep. It rained continuously from May 28 until May 30.

May 29 the expedition started to explore the valley. After traversing it a short distance the members of the expedition were informed that the river was frozen over in the canyon, which latter was reported to be 5 miles long. It was further reported that the ice had broken up in the canyon. Mr. Lewis and I proceeded to the southern end of the valley with the intention of exploring the canyon, but found passage through it impossible. To the west of the canyon was a large mountain about 7,000 feet high, and at the beginning of the canyon was an immense snowslide, which extended almost to the southern extremity of the mountain. The slide had covered the entire valley at that point at one time, crossing the river and extending up the mountain on the east. In fact, the river passed between perpendicular walls of packed snow about 50 feet high even then. The expedition climbed some distance up this snowslide and onto the mountain in the endeavor to get a good view of the canyon. On account of the soft snow this plan was abandoned. The mountains on each side of the canyon appeared to be continuous, as far as the men could see. The compass bearing down the canyon was 200°, and that up the valley 320°. The current in the river between the camp and the canyon was very swift, with several rapids. There were several subdivisions of the stream running through the valley, and all had the same general character; they were very swift, and the water ran over a bed of large bowlders. The whole bottom of the valley was composed of coarse gravel sand, and large bowlders.

There was considerable cottonwood and pine found in the valley, especially near the upper end, where the timber appeared to be excellent. On the lower slopes of the mountains there was also pine. During the stay at this point, from the 29th to the 31st, the men of the expedition managed to get rations from prospectors, and also managed to find several porcupines, which helped them to patch out their food.

On May 31 the expedition divided up into three parties. At that time the glacial stream, which had been followed through the gorge from the glacier, had increased very greatly in volume. A decided thaw had also set in, which rendered travel on the glacier almost impossible without snowshoes. Therefore it was decided that it would be less hazardous if an attempt was made to raft down the river. With this view a good, strong raft was constructed, while in the meantime the remainder of the party was started to explore the country to the north and northeast, through the Copper River. The valley was found to be, in general, three-quarters of a mile wide, and the head of the valley to be 4 miles from camp. Here the expedition separated—Lewis and Fleming going over the foothills to the north, while Corporal Heiden and I attempted to follow the river. Another canyon commenced at the head of the valley, and it was found impossible to follow the river. As it became apparent that the Copper River could not be

reached, the party decided to return, and spent the night at the head of the valley. The barometer reading at this point was 800 feet; thermometer, 65°. Several glacial streams enter into the river in the valley. These streams were increasing rapidly in volume at the time named, and carried a considerable amount of water. The main stream was a raging torrent, which it was impossible to ford, and this prevented me from exploring the country to the east. In every direction were mountains as far as could be seen. One day later Lewis and Fleming returned to camp and reported that there was not a great extent of timber on the left-hand side of the mountain, and that they had gotten through and found the country beyond to be a gradual ascent and easy traveling. They also reported a stream flowing to the northeast, and from their report at this time, as well as from a report of a subsequent journey by Dr. Lewis a long distance down this stream, where it had reached the proportions of a river, I judged this body of water to be the Kotsena, and have so shown it on my map.

The glacier at the head of the Kotsena was crossed by Dr. Lewis, and he reported it very good traveling and a thoroughly practicable route. The country at the head of the Kotsena was reported as being a small plateau covered with moss and large stones, and broken here by small buttes. The valley of the Kotsena was in general about half a mile wide, open, with very little timber, a gradual descent, and the traveling good. The raft being completed on June 3, a start was made down the river. The current was swifter than anticipated, and the raft was whirled and tossed about. Guiding poles were of no use in this swift current. The rapids were safely passed through, however, at the lower end of the valley, but once in the canyon the current would sweep the raft against the rocks, first one side then on the other, when the raft would frequently be almost overturned. The railing which had been constructed on two sides of the raft was thrown off by the rocks almost at the beginning of the journey. The walls of the canyon were very precipitous, and on one side or the other they would generally be perpendicular to a height varying from 100 to 700 or 800 feet. At one place in the canyon the raft was stranded on a sand bar. Later on it struck a large submerged rock in midstream, where, under the strain of the rushing water and the combined weight upon it, the heavy cross logs snapped in two. Half of the raft held together, and after a time the men were successful in getting this portion of it off. Finally, however, the weight was too great, and, as the raft commenced to sink, Heiden jumped to the rocks as the logs were being swept near the right-hand side. Now the remaining portion of the raft turned bottom up, throwing everyone into the water but myself. Pope was carried away from the raft. He succeeded, however, in getting on the raft again, when almost immediately afterwards another rock was encountered, where the raft remained fast. Gardner had already jumped to the rocks on the left, and by his help the members of the expedition were able to get across safely to the rocky beach on that side. All of the men were wet to the skin and chilled with the ice-cold water. We finally extricated ourselves from the canyon by a steep snowslide, which had come down to the water's edge at the lower end of the beach. The height of this slide was 800 feet. The mountain on the left was broken at frequent intervals by draws with perpendicular slides, and we were compelled to go up to the snow line to get around them. When the canyon was finally abandoned the members of the expedition were within a mile of the southern end, where it opened into the head of the wide flat extending all the way to Port Valdez. The total length of the canyon was 4 miles, and its general direction 200°.

After reaching the upper end of the flat the river was found to be divided and subdivided many times, and by fording to the right wherever possible the members of the expedition were eventually able to cross the river. The head of the flat was 14 miles from Port Valdez, and its general features are illustrated on the map. The traveling at first was over a gravelly creek bottom and was very good; but at 5 miles from the canyon heavy timber and swamps commenced, which were hard to get through. Then came foothills covered with soft snow, and subsequently a small lake which is shown on the map. Valdez was reached at 3 p. m. on June 4, after a walk of twenty-three hours without food or sleep. The other members of the party at various times safely returned.

During the months of February, March, and April, 1898, it was estimated that 3,000 people had landed at Port Valdez, Alaska. All of these people were prospectors, who were bound for

the head waters of Copper River and its tributary streams. Of those who had remained in the newly founded town of Valdez, some were merchants, who had opened stores there, while others were prospectors who were waiting until the snow left, when they intended to either prospect along the coast or take the summer trail into the interior. The only practicable winter route across the mountains then discovered led across the large glacier at the head of Port Valdez, Alaska, and this route had been taken by the 2,500 people who had attempted to reach the interior. Up to the middle of April the leading parties had not progressed beyond the summit of the glacier, and there was considerable doubt among them as to the route to be taken to reach the Copper River. It was with the view of quickly determining the proper trail and mapping the route that I undertook the enterprise under the direction of Captain Abercrombie.

Accompanied by Mr. F. C. Schrader, of the United States Geological Survey, on April 26, I started to make a survey of the route mentioned. I left camp at Valdez at 9.30 a. m. We took with us one sled, with a load of about 300 pounds, which consisted of our bedding rolls, a few articles of extra clothing, a shelter tent, snowshoes, an oil stove, a few cooking utensils, and provisions for a two-weeks' trip. Our instruments we carried about us. The average depth of snow at this time was about 6 feet. The sledding was comparatively good, as the trail to the glacier was well worn and the snow had packed from constant travel. The nights, as a rule, had been cold enough to freeze the upper layers of snow into a solid crust. A little earlier in the season this crust was constantly present, and traveling at that time was reported to be excellent. Animals of all kinds were used to great advantage when the trail was frozen. At the time of our arrival at Valdez horses and mules were selling at from $300 to $450 apiece. A horse costing $15 in Seattle would readily bring $300 here, and, if used for freighting, would earn the latter sum for his owner in three or four days. Mules were more valuable still, and few could be bought at any price. A number of burros were also used, but these were not found to be as serviceable as horses and mules. Dogs had been used very extensively and had given valuable aid. A large-sized, well-fed animal of the Newfoundland or St. Bernard species will pull as large a load as a man and will do fully as much work in a day, and they have the great advantage of being able to work in a soft trail, which would break through under any other animal.

The trail to the foot of the glacier leads in nearly a straight line from the beach at Valdez across the large flat which bounds the bay at the eastern end. This flat is 6 miles wide, and in general about 4 miles across from the beach to the mountain to the east. The rise is very gradual, and at the foot of the glacier we found the elevation to be only 150 feet, while the distance by the trail from the beach was 4¼ miles. Arriving at this point at noon, we found there an encampment of from 300 to 400 people. This is at the foot of what is known as the first bench. It has an incline of about 22 degrees with a 50-foot rise, the top of the bench extending for a mile, and the grade is a gradual one to the foot of the second bench.

We reached the top of the first bench by the aid of a block and fall, the use of which was kindly offered to us by the owner, who was then operating it. About 6 men are necessary to drag up a load of 300 pounds even by this means, and we paid for the extra help we received by assisting others. The second bench may be climbed in the same manner as the first, or the sleds may be drawn up a semicircular pass on the side of the glacier. The latter trail, while involving considerable extra labor, was very generally preferred, as it was from 50 to 75 yards away from the side of the mountain to the east, while the lower trail ran along the bottom of a small ravine formed by the side of the mountain and the side of the glacier, and there was great danger in this part of the trail from snowslides. That the apprehension on this score was not unfounded was proved some four days later, when several successive slides covered the whole bottom of the ravine in this vicinity to an average depth of 30 feet.

From the top of the second bench a comparative level of 200 yards brings you to the foot of the third. The latter starts in with three sharp pitches, each with a grade of 15 degrees and a height of about 60 feet. These are also ascended by the aid of a block and fall. At 4.30 p. m. we had reached the top of the second of these pitches, a distance from the beach of about 6¼ miles, and there we decided to camp for the night. The wind, which heretofore had been light and from the west, had by this time veered round to the south, and in a short time we had a heavy fall of

wet snow. A southerly wind invariably means wet weather, as the large amount of moisture brought with it from the North Pacific is condensed by the cold of the glaciers and falls as snow or rain, according to the altitude and the season of the year. The storm continued intermittently throughout the night of the 26th, and the next morning the trail was soft and wet and but little progress could be made, and that only by great exertion.

The start on the 27th was not made until 10 o'clock, as the mountains previous to that time had been obscured by fog and falling snow, which rendered topographical work impossible. At 10 o'clock the weather cleared somewhat and we decided to push on, but we were able to make only a mile and a half that morning as the result of three hours' hard pulling. By noon the condition of the trail had become so bad that all work on the glacier was effectually stopped. Soon after this it began to snow vigorously, and as there was a steady southerly wind that gave no promise of an early termination of the storm, we decided to cache our outfit and return to camp at Valdez until the weather cleared sufficiently to enable us to continue our work. We reached our camp in two hours. Learning here that the leading prospectors had found the right trail to the Copper River, it was decided that on our return to the glacier we should leave our outfit at the cache and survey the trail as far as the summit of the pass and then return to the cache, and later explore a glacier to the south with the view of finding a shorter and better trail.

April 28, 29, and 30 the storm continued without intermission. The fall of snow for the four days was over 60 inches.

On May 1 the snow gave place to a warm rain, which settled the snow to nearly its former level and packed it to a considerable extent, so that when the storm lifted later that night the cold weather made it possible to make fair progress over the trail. A start was again made on the morning of May 2. When passing the second bench we found that even the upper trail had been covered to a considerable extent in places by the snowslides of the 29th and 30th, and a number of men were then burrowing in the snow in an endeavor to find their buried caches. The first of these slides occurred on the evening of the 29th. It extended over to the trail on the side of the glacier, and had buried six men who had camped there at the beginning of the storm, together with some twenty-five burros which they employed in freighting. The men were all taken out alive, suffering severe bruises. The burros were less fortunate, ten being killed and the remainder badly used up. The whole of that day, and in fact all during the preceding storm, snowslides were constantly occurring. The mountains being very precipitous and covered with loose bowlders, every slide would bring with it a large quantity of rock, causing a roar which, in the case of a large slide, could be heard for 5 or 6 miles.

At the top of the third bench the altitude was found to be 800 feet, and the distance from the foot of the first bench 1½ miles, making an average grade of about 1 in 12 for this distance. From the top of the bench a deep narrow canyon opens out to the right, the general direction of which is N. 25° E., magnetic reading. The canyon has a steep grade and carries a small dead glacier. On reaching our cache we found that we were at the beginning of a long encampment along the trail, the extent of which we had not been able to see when making the cache on account of the storm. These encampments were a common feature on the glacier. We found that prospectors as a rule carried with them an outfit averaging 1,500 pounds per man. Few prospectors were provided with pack animals, and, as a good load for a man on even the gradual slopes of the glacier is only 150 pounds, an outfit of 1,500 pounds would necessitate ten trips, loaded, over the same ground. We found that the best progress was made by those who made trips not longer than 2½ miles. Having the camp at one end and the cache at the other, the best workers would make on a fair working day, or rather night—for that is usually the best time for working on the glacier—five trips, carrying 150 pounds each trip, for 2½ miles. Progress over the benches is necessarily much slower, but on the average a good worker could make the 23 miles from the bench to the summit with 1,500 pounds in eighteen days, provided he had good working weather.

The glacier presents some special difficulties which may be mentioned here. Warm, nourishing food and good drinking water are of first importance, and both involve the use of some kind of fuel. A good oil stove has been found to be the best solution of this problem. Toward

the latter part of April, after the snow has begun to melt, water may be obtained near the foot of the glacier, but after leaving this there is no water for 27 miles, and it is necessary to melt either snow or ice. The nearest dry wood is 1½ miles from the foot of the glacier, and for those who are not provided with oil stoves a great amount of extra labor must necessarily be expended in hauling wood. At the summit of the glacier wood sold for 20 cents a pound, a small piece of dry cottonwood a foot long and eight inches in diameter readily bringing $1.

For half a mile along the second bench, and for three-fourths of a mile before reaching the summit, snowslides are a source of considerable danger during and just after a storm, and a camp or cache should not be made at these places. Sudden changes of temperature are apt to occur. An icy wind will sometimes start from the upper glacier and cause a change of temperature in a few minutes of 20 to 30 degrees, and if not provided with extra clothing for such an emergency a chill is more than probable, and this may result in pneumonia. Snow-blindness is very common on the glacier. Besides the pain and the possibility of a permanent injury to the eyes, it involves loss of time, as it is necessary to keep the eyes closed for a brief period. It generally takes three or four days to effect a cure, and then there is considerable liability to a recurrence if care is not taken to keep the eyes well shaded. Snow glasses should be worn constantly while on the glacier. I have seen a pair of very inferior smoked glasses sell for $5.

Crevasses must be guarded against as soon as the snow begins to melt on the lower glacier. At the present time no crevasses were open across the trail, but in several instances several narrow crevasses have opened a few feet away from the trail, near the foot of the glacier. These crevasses extend clear through to the bottom of the glacier, as on dropping stones into them the splash into the glacial river was distinctly audible at the end of the fall.

From the encampment, a mile and a half from the top of the third bench, the trail is a gradual grade halfway across the glacier and leads in a northwesterly direction for 1½ miles. From thence it leads to the north for nearly 2 miles to what is known as "Five-Mile camp," so named from its estimated distance from the top of the third bench. Here we found about 300 people. The average width of the glacier from the foot to a point 3 miles above Five-Mile camp is 1½ miles. At the latter point the glacier narrows to 1 mile, being forced between the high mountain on the east and a sharp, projecting spur of the mountain on the west. This causes the ice mass on the west to crumple up into a series of perpendicular ice ledges, the clear blue ice of which is visible at a distance of 5 miles.

Opening out to the east between Five-Mile camp and the ice ledge is a large canyon, the mouth of which is 2½ miles wide. This canyon contained at one time a large feeder of the main glacier, but at the present time the canyon glacier is separated and is apparently receding. From the ice ledge the trail leads northwest for 1¾ miles to the foot of the fourth bench, where was found an encampment of about 350 people. Here we learned that the trail was not broken through to the summit, and, it being 8 o'clock in the evening, we decided to spend the night there. At this time of the year there is very little night. It does not get dark until nearly 10 o'clock. It commences to get light by 2 o'clock. During a storm it was the custom to keep traveling over the trail with empty sleds in order to keep the trail open, but the storm which commenced on April 27 was so severe that this was soon given up, and all spare energy was given to keeping tents and goods from being snowed under. Near the summit of the glacier it was reported that over 10 feet of snow fell during the five days' storm.

Leaving camp at 4 a. m. May 3, we again started up the glacier. Early that morning a new trail had been broken by a working party coming through from the summit. Some went in advance with snowshoes, while others followed with shovels or light sleds, packing down the snow. The fourth bench is a slope averaging 10 degrees for a quarter of a mile. The rise is then gradual for 5 miles and the direction a little to the west of true north, to the foot of the summit. At the latter place there was a camp of fully 400 people. From the fourth bench the glacier widens out until at the foot of the summit it forms a large bay of ice extending down some 3 or 4 miles to the westward. Here the elevation was found to be 3,900 feet. The distance from this point to the summit is three-fourths of a mile, and the angle of slope nearly 17 degrees. The altitude of the summit is nearly 4,900 feet. On the second night before we

reached the summit there had been a heavy snow slide from the mountain to the right which had buried some twenty-five or thirty people who were encamped along the trail. These were located by their cries, which could be plainly heard through the snow, and all but two were taken out alive. A number of caches were covered to a depth of from 15 to 25 feet, and few of these were ever found, as the goods had been swept away in the slide. At the summit the air was much lighter than at the foot of the glacier, and it was also much colder. The distance from Port Valdez to the summit by the present trail was found to be 23 miles. Having reached this point, sledding down to the Copper River is a comparatively easy matter as long as the weather remains cold enough to form a crust on the snow. We found that prospectors loaded their sleds with as much as they could carry, occasionally as high as 1,000 pounds, for the trip down on the other side of the glacier. Just beyond the summit we found a camp of about 300 people. On this side the glacier averages 1 mile in width, and it extends with a gradual grade for 6 miles in a general direction N. 12° W., magnetic reading. The mountain ranges on either side are unbroken for this distance, and are between 4,000 and 5,000 feet high.

Being the first army officer to go over the glacier, and the pass being yet unnamed, I was given that privilege, and accordingly named it Bates Pass, after that most excellent and esteemed soldier, Brigadier-General Bates, United States Volunteers, and formerly colonel of the Second United States Infantry.

ACROSS VALDEZ GLACIER WITH SLEDS DRAWN BY HAND.

By Lieut. GUY H. PRESTON, Ninth Cavalry, U. S. A.

Under the orders of Capt. W. R. Abercrombie, on April 25, 1898, I organized an expedition to sled by hand across Valdez Glacier, the object being to place a cache as far up Copper River as possible. I took with me 13 men and 7 sleds, with 2 men to a sled. Each man was allowed 40 pounds of bedding and changes of footgear. Each sled was loaded with a total weight of 300 pounds.

Setting out April 26, we gained the top of the second bench of the glacier, but not without great labor. When we reached the top all of us were completely exhausted. We bivouacked in the snow, using an oil stove for cooking and melting snow. Fuel could not be obtained on the glacier. Such as was procured was brought from the beach. April 27 we set out along trail, hoping to reach the summit. Arriving at Five-Mile camp in a snowstorm, I found the trail beyond obliterated. I changed my plans at once to meet this condition, knowing that the trail might not again be open for several days. Not wishing to camp for that period and consume rations which had cost so much labor to transport, we returned to the beach, a distance which I estimated at 11 miles, caching the provisions at Five-Mile camp. I then recommended to Captain Abercrombie that upon setting out again I should advance into the country after the manner of prospectors, with a small party, sending back several men from the summit as soon as I should have attained that point with my cache. I also proposed that upon setting out again I should take additional supplies.

April 28 I completed preparations for my second departure. Warm rain continued upon the beach and a blizzard prevailed upon the glacier. April 28 the storm on the beach turned to snow, with a very heavy fog. The trail was deserted and was impassable by anybody. April 30, 30 inches of snow had fallen, and it still continued heavy and wet. Everybody was waiting to move, because they were alarmed and fearful that the glacier trail would be cut off for the summer. May 1 the storm continued, changing to rain.

At 9.30 a. m., May 1, the sky cleared. Prospectors upon the beach set out and broke trail. I followed at once with 11 men and 5 sleds, arriving at our cache at Five-Mile camp with the additional load. I found the trail on the lower benches rapidly disintegrating. At the third bench a snow slide had killed 13 head of stock, several men barely escaping death. Not being

provided with block and tackle, we found sledding on the steep ascents to be desperately hard work. The prospectors in this respect had much the advantage over us.

I set out May 3 to put forward the cache as far as possible, and after going 3 miles I found the trail beyond to be impassable. A severe rainstorm prevailed, making the trail very slushy. Fearing another long delay, I dismissed three of my men and sent them back to the beach. The party now remaining, in addition to myself, consisted of Corpl. Robert A. Koehler, Company B, Fourteenth Infantry; Private Henry L. Tolley, Company H, Fourteenth Infantry; special agent of the War Department, A. W. Gumaer, and civilian employee, Harvey A. Robe. My assistants were especially selected for their pluck and endurance. Upon this date a snow slide was reported to have occurred at the base of the summit at 10 p. m. the previous day, two men being killed. The rainstorm cleared away and we put forward 400 pounds more to the advanced cache, making 1,600 pounds put forward during the day, of which 1,440 was clear food. By the men whom I sent back I dispatched a request to send forward additional supplies, urging the importance of a large cache beyond the summit. I observed that the glacier is commercially an impracticable route at any season. One thousand people going back and forth in March and April, and possibly late in February, may keep it open for sledding part of the time.

May 3 we moved our camp equipage and 340 pounds additional provisions sent out by Captain Abercrombie as far as Five-Mile camp to Twelve-Mile camp in two trips, and moved our entire cache to the same point by working far into the night, while the trail was frozen. May 5 Mr. Robe and myself went back to Five-Mile camp and brought up the last remnant of 284 pounds at that point. The terrible heat of the sun made the trail so slushy that we were four hours in returning. I call the fourth bench 16 miles from the beach. During the day the party worked raising the cache over the fourth bench, nearly finishing the task. I observed that the trail at this season is always slushy and slumpy after 9 a. m. It stiffens up again at about 9 p. m. enough to bear a man, and enough to bear horses at 1 a. m. The horse and foot people were violently at odds, each interfering with the other, on account of the trail being but 18 inches in width. Horses in use upon the trail quickly learn to hold it, for to step aside means to slump down very deep in snow.

May 6 we raised the cache completely by working after midnight and sleeping late in the day to rest the eyes of the party, which were all badly "touched." Snow-blindness is a sad affliction everywhere on the glacier. Many people are led away totally blind for the time being. This condition is caused by the terrible glare of reflected sunlight upon the snow and by the long hours of daylight at this season and latitude. Most people are affected at a time when they least expect it, namely, when the sun is concealed from view by fleecy clouds which settle down upon the glacier. At these times the refraction and diffusion of light rays is more trying to the eyes than direct reflected sunlight when the sun itself is not obscured. This day the roar of avalanches of snow upon the mountain sides of the glacial gorge was continual. In many places the body of snow upon the bosom of the glacier falls through crevasses before unseen. I now had 1,840 pounds of clear food at the top of bench, and after nightfall brought up my camp to the same point.

May 6 and 7 we worked on through the night, hauling 700 pounds to a point near the foot of the summit ascent, about 20 miles from the beach. We also worked on through the night of May 7 and 8, advancing 900 pounds more to the foot of the summit. May 9 we broke camp and carried the balance of our provisions to the foot of the summit. At this point I found many people disheartened and turning back. Tons of provisions lying in the cache were buried and lost by the last great fall of snow. All along the trail I was subjected to the miserable humiliation of being passed by the civilians with their outfits, having in use horses, mules, burros, dogs, and even goats. Our Government party was, of all the outfits I saw, the most poorly provided with means and material for progress. I observed that range horses, half-breeds of 800 or 900 pounds in weight, such as are raised in Montana and Wyoming, are the animals of the greatest utility upon the trail, and best retain their flesh. Beyond the glacier they will be equally useful as pack animals under the sawbuck saddle. Mules on the glacier, while useful, are not so desirable, on account of their small feet breaking through the crushed trail. On the night of May 9 we raised

329 pounds to the top of the summit by back-packing. The summit ascent straight away along the block-and-tackle trail is 5,100 feet in length and 1,100 feet in height. This length I learned by the amount of rope in the blocks.

May 10 a severe blizzard prevailed, and we remained in our sleeping bags, emerging only long enough to cook when hungry. Everybody suspended work upon the summit, being unable to see more than a few feet. May 11 we resumed back-packing and placed 2,000 pounds halfway up. Five members of the party were strung out and each man packing 60 yards, thus lifting the entire cache 300 yards at once. May 12 wet snow fell, but we worked notwithstanding. Private Tolley succumbed to exhaustion. May 13, the snowstorm still continuing, we hoisted a portion of our cache, but were deterred from working longer by the obliteration of the trail. Private Tolley remained sick in his bag.

May 14 we broke camp and moved to the top of the summit. The lower camps were rapidly moving up to the summit by working night and day, on account of the obliteration of the trail on the lower benches. A similar condition prevailed in the interior, beyond the summit, and the whole procession of gold seekers stopped in timber to essay the building of boats. Whatever the leaders do all behind blindly imitate, whether they know or not that navigable water is ahead. This day Private Tolley's condition became so alarming that I resolved upon putting the last pound over the summit, to make my way back to the beach and send up the hospital stewart with a detachment and bring him back. A civilian physician had already diagnosed his case as typhoid fever. I also wished to see for myself whether or not I could get pack animals over the glacier. I left the summit at 12.30 p. m. and arrived at the beach at 7.30 p. m. I found it impossible to get pack animals from this point over the glacier to my cache. I left orders with the corporal to move on down the reverse glacier to timber—an easy descent for about 8 miles—and there await my return. Should my proposal meet with the approval of Captain Abercrombie, I would send back the detachment and go myself alone into the country, throwing in my cache as a grub-stake for a year and a half with a party of prospectors representing eastern capital, and provided with proper means for penetrating the country. So far as I can see, this is the only way that a cache can be now used to get maps of the country.

Lieutenant Preston did not return to his party. The following extract from a report made by Guide Gumaer gives a synopsis of this expedition until its return to camp:

Lieutenant Preston set out at once for headquarters camp for the purpose of sending the hospital steward to the rescue, with instructions to take Tolley to the beach. I was ordered by the lieutenant to remain on the summit until the hospital steward arrived, and when Tolley had gone to move our cache down the other side of the glacier to Twelve-mile camp at the timber, there to await further orders. On the third day the hospital steward arrived, and Tolley, thanks to the kind treatment he had received from Mrs. Dowling, was perfectly able to stand the trip to the beach. The next day the hospital steward and his men placed Tolley on their sled and started for camp. After he was gone the three of us who were left, Corporal Koehler, Harvey Robe, and myself, loaded our sleds and started for Twelve-mile camp, on the other side of the glacier. The descent on the other side is a gradual slope, ending about 6 miles down at the foot of the glacier with quite a steep descent, the amount of load a man was able to take down hill being only limited by his ability to hold back. At the foot of the glacier we found a few tents, but as this was not down to timber we continued on over a level valley, with a small stream running from under the glacier. This valley is about 1 mile wide. It is gravelly, with small bowlders worn round by the action of the glacier; high mountains on each side as far as Twelve-mile camp, where the valley widens out and timber commences, the latter consisting of spruce and cottonwood. We arrived at this point about 8 p. m. and pitched our tent for the first time on the trip.

This camp contained about 125 tents on both sides of the stream, in good timber. A great many parties were whipsawing lumber preparatory to building boats, and a great many boats were in all stages of completion. This was a busy camp. Here we remained until May 28, going back to our cache at the summit until it was all sledded down and safely placed at our tent door. Then we proceeded to look around. We took several long walks down the river to other camps, and climbed the slope of the mountain on the other side of the stream opposite to our camp, where a fine view was had of the large lake which lay down the valley from us about 16 miles. I took the bearings of this lake from where I stood on the slope of the mountains and found it to be nearly due north.

May 28 we received orders from Lieutenant Preston, commanding in the absence of Captain Abercrombie, to turn our cache over to E. J. Cooper who would look after it, and return as soon as possible to headquarters. This I proceeded to do, taking Mr. Cooper's receipt for everything, which was turned in to Lieutenant Preston on my arrival. Our return trip was a very hard one. We walked twenty-five hours steadily without any sleep over a very difficult trail, the snow having melted off the glacier since we went over, opening great crevasses, and making it

necessary for us to pick our way to avoid falling in some hole or crevasse of unknown depth. This we ascertained by dropping stones down places where we could not hear them reach bottom.

On our arrival we found Lieutenant Preston in command, he informing me that Captain Abercrombie had gone after pack ponies. This I considered very necessary, as it is impossible to do anything in this country without pack animals of some description, and I consider the pack pony the best animal for this purpose. In fact, ponies were selling on the glacier at that time at from $260 to $500 each, and those having such animals were going more than twice as fast as those without. Dogs do very nicely on the snow, but are of no use at any other time.

MY TRIP FROM VALDEZ TOWARD COPPER RIVER.

By Hospital Steward, JOHN W. CLEAVE.

It appears that no information was obtainable as to the country beyond the canyon from which Lowe River emerges at the head of Valdez Valley. "Squaw men" who had gone thus far questioned the possibility of proceeding farther than the source of that river, yet it had been determined that the end of Corbin Glacier, of the so-called "Summer Trail," is at the head of said canyon. To determine whether or not it were possible to reach the Copper River in that direction, and especially if the route were practicable for a pack train, was the object of this expedition.

On Sunday, June 19, 1898, an expedition consisting of Lieut. P. G. Lowe, Hunter Brown, Corporal Heiden, Private Studt, and myself started from Valdez. An equitable division of the load was made, one carrying a knapsack and three carrying Merriam packs. The pack of each consisted of one blanket and half shelter tent and the salt beef, flour, and coffee portion of the ration for fifteen days. To June 24 the expedition was under command of Lieutenant Lowe and will be covered in his report. On that date Lieutenant Lowe suggested that himself and Brown confine themselves to Valdez Valley, while the others explore toward Copper River. Accordingly we divided the provisions and started to cross the foothills forming the south side of the canyon separating the first, or Valdez Valley, from the valley beyond, now known as the second valley. Heavy rain made us camp early. We cooked and ate a porcupine, of which we saw several.

Next day, June 25, we reached the second valley. By keeping up high we avoided all brush. June 26 and a part of June 27 we spent in bridging the stream issuing from the east end of the Corbin Glacier. We then visited the camp of some prospectors close by. They were three Dutchmen, the only people in the valley, and they were unable to give us any information except the welcome news that they had bridged, with two logs, the glacier stream issuing from the next canyon. They also replenished our slender stock of provisions, we giving them written assurance that they would receive the equivalent at Valdez.

June 28 we marched to the head of the beach, where the drenching rain kept us till June 30, when we made an exasperating march over fallen timber and through brush. July 1 it rained again, and we spent the day mending our packs, having luckily brought along thongs which answered the purpose very well. We had been so greatly annoyed at the loss of time occasioned by the rain that we determined thereafter to ignore it. This we did, although the discomfort of being wet was of less moment than the task of carrying the additional weight caused by blankets, etc., being soaked.

July 2 we marched over moss and bog, crossing three deep ravines containing swift mountain torrents, to the head of the valley. The valley has about the same dimensions as the Valdez Valley, being really one with it, running northeast and intersected only by foothills. The west end has 5 miles of beach, over which the Lowe River runs, changing its channels as it floods and falls. After the first mile the stream from Hogback Glacier has to be crossed. One and one-half miles beyond is a canyon running north and a valley running south, from each of which issues glacier water which can neither be forded nor swum. Beyond these important tributaries the river shrinks to half its volume, and comes from a canyon east about 2½ miles beyond. This

canyon, after running 7 miles northeast, ends at a glacier at the south side of a valley. Half the water in the canyon comes from this glacier, or rather system of glaciers; the remainder from a snow-laden beach which runs from near the mouth of the canyon to the north side and end of the valley, where is the glacial source of Lowe River. This beach is 1 mile wide and 8 miles from the beach at the west end of the valley. The intervening foothills consist of benches, with alder bushes and grass and moss plats. Half way up the valley ends the timber, which is spruce and cottonwood. Before reaching the timber line so great is the number of fallen trees that walking, especially with packs, is very difficult. We now know, however, that by keeping to a bench higher up the mountain we can avoid most of what hindered us so greatly. We killed duck and ptarmigan in this valley and saw two fine black bear.

At the eastern termination of the bench containing the head waters of Lowe River is the divide. Within a few yards and almost on a level one stream runs east and another west. Following the water running east we, on July 3, entered what may be known as the third valley. Streams from all sides augmenting it, we followed our rivulet about 2 miles to its junction with a glacier stream which flowed from a glacier at the south end of the divide. At the junction a narrow canyon commences and we left it to climb the foothills, which are here high and chiefly on the north side of the valley. We went over snow and soggy grass and occasional bogs to the first of a ten-mile series of beaver pools. Here, on killing a beaver and some ptarmigan, we camped. To celebrate the Fourth of July we prepared ourselves a feast of duck, ptarmigan, beaver, and wild celery. While we were yet celebrating the sun came out. Unseen for many days, we welcomed it by immediately packing up and marching till long after midnight. We walked over beaver dams, through marshes infested by mosquitoes and yellow flies, and through interminable brush. The way being unknown to us, we climbed the mountain ledges to get views ahead, but waterfalls and cascades would drive us down again to where the ravines were passable. In this manner we traveled three times the distance required, and through brush and mire, which we avoided on our return journey. July 5 was very similar. On that day we traveled more than twelve hours through brush, unrelieved by any open, breaking our packs and tearing our clothes. We also crossed a glacier stream on a bridge of alder bushes. However, from an eminence we saw our river empty into a much larger river running at right angles, and this greatly encouraged us.

July 6 we went down to the beach, the canyon, perhaps 3 miles long, having terminated about 2 miles above. We had clear walking for some 4 miles, when the course of the river again forced us to the brush. Soon the increasing flooding of the river drove us toward the foothills, where we again encountered the beaver pools with their hosts of mosquitoes. We crossed the second glacier stream on the north side of the valley on a fallen tree. Here is the first timber in the valley, which is spruce and cottonwood.

July 7 we walked around the beaver pools, closely following the bear trails. Because of the thick brush and high grass it would be difficult to get along without the bear trails, but every beaver pool has its bear trail around it. At last we reached the big river running south by east. A rocky ridge projects there and many islands are in its course. Over the main channel a volume of vapor hung, such as one often sees over large rivers. Both the rivers were followed. The big river has mountains on either side, the beach width being about 2 miles. In each river it was evident there was no constant channel. Manifestly the large river is Copper River and the rocky ridge part of Cottonwood Island. That would make our river the Tanana.

Some 4 miles below us we could see the divide of another river running west—that is to say, entering the left bank, or coming from the east—that we determined was the Bremner River. So inspiriting was the scene that we debated whether we would endeavor to go down the river to its mouth at Alaganik. Our provisions were exhausted, except for the emergency caches we had left at each camp for our sustenance on our return journey, yet we had ammunition and we expected to find Indians, although we saw no sign of human life, nor had we seen any since leaving the three Dutchmen. At last the uncertainty as to the continuance or recall (because of the war) of the expedition ruled and we decided to return. We first climbed a mountain to the distance of 2,500 feet, but fog prevented our seeing what we desired. Like all the mountains

we passed, the formation is slate. We saw beds of violets, roses, and other perfumed and gorgeous flowers. Wild currants and other berries, wild celery, and skunk cabbage were plentiful. Alder bushes are everywhere, and dwarf birch is occasionally seen. Devil's clubs are universal and as annoying as the mosquitoes. Good grass is everywhere and grows extremely fast. Timber is scarce, but there are occasional patches of spruce and cottonwood. We saw moose tracks, but saw no moose. We saw one mountain goat. Huge eagles were seen almost hourly, and many hawks and sea gulls. Jacksnipe and orioles are as plentiful as ptarmigan, and, like them, may almost be caught by the hand. Broods of young ducks we saw on many pools, and we saw also wild geese.

The third valley has a rugged look. The second valley seemed to be hedged in by mountains, and one would not suspect a third valley before reaching it. On its south side are four big glaciers, two being much larger than the Valdez. Brush covers their terminal moraines. Ice constantly breaks off and falls into the river with deafening noise, making the newly presented face a deep blue.

The valley runs east for 7 miles, then northeast for another seven, being about the same size as Valdez Valley. Although there is a noticeable foothill summit from the Tanana side, there is neither glacier nor mountain pass to divide either from the other. Roughly speaking, each of the three valleys is about the same size, say 14 miles by 4 miles, distance by air line; actual trail distance is much more. In this manner the total actual distance to the Copper River from our base of supplies is probably not more than 40 miles. Except for the necessity of bridging the glacier streams, the trail is easy compared with Sierra trails. For animals, also, the country is at this date self-sustaining. The swiftness of the currents attests the grades of the river beds, yet that grade seems uniform. We saw no rapids in the Tasnuna. There are quicksands, however, as in Lowe River, to which stream it is very similar, except for the rapids of the latter. So low is the divide that in winter when the ground is frozen, or at other times if the water subsides sufficiently to enable animals to go along the bed, the pack train should make with comfort the entire distance between Copper River and Valdez in four days. Quicksands on the beach, as well as bogs on the foothills, can be avoided.

Our return journey was uneventful to the divide, which we reached July 11. We had previously noticed a valley north of that traversed by us, which we thought might be that of the Kotsena. We desired to investigate, but desisted for the same reason that we did not descend the Copper River. July 12 we shot with the rifle a big black bear. He was hit once in the abdomen and once in the back. The bullet from a .38 Colt revolver glanced off his skull, and we regretted bringing the revolver. A shotgun on such a trip would be especially valuable.

Because of the great flooding of the river, we hastened to cross the glacier stream coming from the north canyon in the second valley. To do this we marched from 8 a. m. July 12 to 4 a. m. July 13, only to find that not even the rock on which the former bridge rested was now visible. July 13 we endeavored to bridge it by snaking drift logs to the stream. We failed, and lamented the unwisdom of not taking an ax. July 14 we tore up one blanket and our shelter halves into strips, braiding them into ropes to splice logs, but the raging waters tore away ropes and bridge, and carried with them a revolver, our belts, mess equipment, maps, and all the minute details we had compiled for use on our return. We then tried to climb the mountain and get around the stream; but, unlike the glacier below, there is here a canyon stretching an unknown distance north. We had been two days without food, and, therefore, we returned. Next day we intended to swim the main river twice, as we had seen a bear do successfully. However, at that stage a party of six civilians arrived. They informed the aforementioned Dutchmen of our condition, and these Dutchmen again gave us food. July 15 and 16 the civilian party endeavored to bridge the stream. Notwithstanding the fact that they had axes and ropes, the fearful swiftness of the current frustrated their efforts, and they would have abandoned their expedition had we not been on the other side. July 17 we built a pier of rocks and placed thereon three logs, which projected over one-third of the stream, and we piled bowlders onto their butts. A similar pier and bridge was erected on the other side. We then put a long, thin, dry spruce tree on the cross

pieces of each of the three trees, thus completing a bridge which will suffice should the stream even double its abnormal volume as gauged by its surroundings. July 17 we crossed.

The civilian party was under Dr. Lewis, who informed us that Captain Abercrombie had employed them on a trail mission in the valley parallel to the one we had explored. They would even then have been compelled to return had not the three Dutchmen supplied them with flour and bacon, sugar and coffee.

July 18 and 19 we waited for the fog to clear on Corbin Glacier. July 20 we crossed it. It took us four hours to get from the beach onto the glacier, and another four hours to reach the Valdez termination of it. July 21, after fording the glacier streams in the Valdez Valley, we arrived in camp. It may be observed that the Corbin Glacier, the glacier to its north, as well as the tributary to the Valdez Glacier, seen from Valdez, all seemed to us to have the same outlet in the second valley. Furthermore, it appeared that by taking the northern sheet of ice beyond the summit of the Valdez feeder, instead of the eastern one, we should reach the glacial source of the Kotsena River.

Our trip was enjoyable, albeit severe. Its success was fostered, if not occasioned largely, by the three Dutchmen.

UP LOWE RIVER, ACROSS DIVIDE, TO COPPER RIVER.

By Corpl. ROBERT HEIDEN, Company F, Fourteenth Infantry, U. S. A.

The work for my section, section 4, as laid out by Capt. W. R. Abercrombie, was to find a trail up Lowe River and over the divide, and there connect with the third section for exploring the Copper River Valley.

On September 2 I started from camp No. 1, Port Valdez, with 3 enlisted men of the Fourteenth Infantry, namely, Privates Studt, Swager, and Tolley, and 10 head of pack animals. The progress made was very slow, owing to the heavy rains, which had caused the glacial streams to swell and flow with a rapidity of 8 or 10 miles an hour. In trying to cross the first day our men and horses were washed off their feet several times, and only after several desperate attempts did we succeed in crossing the stream and establishing a camp at the foot of the glacier, at Corbin Pass.

The next day, September 3, we cut trail. September 4 we moved camp early in the morning, and at about dusk reached camp No. 2, in the foothills inclosing the valley leading into the Keystone Pass. At this camp we were compelled to remain several days, owing to the heavy rainfall. On the afternoon of September 8 the rain ceased and we followed the trail that we had cut during the interval to camp No. 3, about 6 miles farther up the valley from camp No. 2, arriving there late at night. Our pack animals were badly done up, on account of miring down in soft ground. The rain commenced again the same night, and as we had to cross the valley in order to make the mouth of the first canyon in Keystone Pass, we were forced to wait for the water to fall before we could proceed. Lowe River is fed principally by glacial streams, and when a warm rain sets in, which causes the glacier to melt, it rises to a tremendous size, making it impossible to cross the valley through which it runs. Whenever we had a few hours' clear weather while waiting for the river to fall, we utilized the time by cutting trail through the dense growth of alders, and graded the hillside, which was extremely hard work.

When the water had fallen sufficiently to allow us to cross the valley, we had the trail all ready, and moved camp to the first canyon in Keystone Pass. This canyon is about 2½ miles long. The walls on both sides are almost perpendicular, rendering it necessary, therefore, to find a route around one of its sides. I divided my party and sent men out both sides of the canyon to find the most practical route for a trail. On this stretch, from the mouth to the head of the canyon, we made three camps. From the head of this canyon we had about 4 miles of comparatively easy traveling over what is known as the "Intercanyon Basin."

The second canyon is not quite so long, and is followed by another valley. The weather was

very cold, the snow falling constantly on the mountains, reaching a depth of several feet, and coming down almost to sea level. From the head of the second, or Cleaves Canyon, we bore to the north in order to find a low pass through to the Kotsena River over which we could cut trail. Before reaching the foot of the mountains, where the ascent commences, we had to cut through about 5 miles of alder brush and windfalls, very slow progress being made. After two days' exploring we succeeded in finding a way around the canyon and went to work cutting trail. From this point on a great deal of grading had to be done, as the steepness of the hills made it impossible for animals to travel on the hillsides. It required about two weeks' continuous hard work to make a trail around this canyon, and at some places we went over an altitude of 2,600 feet. This could all be avoided by blasting a roadway close to the river through the canyon, while of course it would require a great deal of work and could not be accomplished without expense.

I detailed two men of my party to explore the valley of Kotsena River. They reported that a pack train could be brought through to the first lake without difficulty. The elevation of the Kotsena River is somewhat higher than that of Lowe River. With but few difficulties to overcome, this trail could be prolonged to the mouth of the Archer River and from there to Copper Center.

A courier arrived in camp with the information that the third section of the expedition had been unable to find a practicable route up the Kotsena, and had chosen the valley of the Tasnuna as a route by which to go out to the coast. We therefore came back to the mouth of the second canyon and endeavored to find a trail in an easterly direction so as to meet them. After three days' travel we found them, without horses and almost without provisions, and learned from them that they had lost their whole outfit and one man was drowned in trying to cross the Archer River on a raft. At that time, October 13, the snow commenced to fall on the level, and continued until there was a depth of 2 feet. The object of my section being accomplished, I returned to camp No. 1, arriving there October 20.

The great advantage of this trail is that it is free from glaciers; consequently the traveler does not suffer from want of wood. In the winter and spring, when the canyons are filled with snow, one can sled on the crust down to a point where the Tasnuna empties into the Copper River, a distance of 49 miles; and in the summer time this trail can be used, making this route available all the year round to the Copper River Valley. With but small difficulties to overcome, a railroad could be built to the Copper River country by this route, as the grade from Port Valdez up the Tasnuna Divide is almost imperceptible, with the exception of the points where the railroad would have to be made through the canyons. The hills on both sides are covered with spruce and hemlock and the valleys with cottonwood. As soon as snow melts off the ground grass sprouts up in abundance, which gives an ample supply of food for pack animals. All kinds of berries can be found on the hillsides—salmon berries, huckleberries, blueberries, and cranberries. As to game, three species of bear exist here, viz, black bear, brown bear, and the silver-tipped, or Alaskan, grizzly bear. Grouse and ptarmigan abound in the mountains. On the far side of the Tasnuna Divide innumerable beaver dams can be seen. Gold can be found in all streams, and I am confident it will be found in paying quantities as soon as a class of prospectors come into the country who will go at prospecting with energy. I have panned out as high as 50 cents to one pan. This was taken from a small crevice at the mouth of the second canyon on Keystone Pass, a sure indication that the gravel in the valley contains gold. So far the country has not been prospected, as it is impossible to reach bed rock during the summer months, owing to the water. Gravel banks of washed gravel can be found to a height of from 50 to 500 feet, sure indications that the basin was formed years ago and filled with water to that height. In my opinion it has been a tremendous stream or lake that has washed the gravel into it. To thoroughly prospect this vast territory would require at least two years' work, and I am confident from all indications that pay dirt can be found.

A TRIP TO COPPER RIVER.

By Corpl. ROBERT KOEHLER, Company B, Fourteenth Infantry, U. S. A.

The party consisted of Schrader, geologist; Mahlo, surveyor; 7 enlisted men, and 3 packers. The pack train consisted of 23 animals. Each animal carried an average of 175 pounds of provisions, including bedding. Each animal was led. We crossed the valley and reached the foot of the glacier after traversing a distance of about 5 miles. During the ascent a heavy fog settled on the glacier, which made it very difficult for the men to pick their way. The yawning abysses surrounded the party, compelling the horses and men to proceed very slowly. In some places the trail was not over 2 feet wide, with crevasses right and left 50 feet wide and hundreds of feet deep. To fall into one of these crevasses meant instant death to men or beasts. The horses with characteristic instinct seemed to realize the perils that surrounded them, and, like the men, measured every step as they proceeded; even the bucky ones were meek as lambs. On account of the difficult ascent the horses had to be repacked very often, as the sling ropes would loosen and this would cause the pack to slip. At times an animal would slide into a crevasse and all hands nearest him would immediately proceed to help him out. In such a case the horse was quickly unpacked, the men would place a rope around its haunches, and then with a strong pull and a pull altogether the animal would finally be liberated. As one man after another reached the top of the bench a shout would be uttered. Finally, after many difficulties, the glacier was passed. On the other side the traveling grew better and the crevasses were not so many. At 9 o'clock in the evening the foot of the fourth bench was reached. Fifteen miles were covered on that day and it was decided to camp at the foot of the fourth bench. The picket line was prepared by using big bowlders as posts, and the horses were unpacked and fed. In the meantime it was raining continuously and every man was wet to the skin. In order to gain shelter of some kind the little dog tents were put up on the ice. None of the men slept that night. On the morning of August 6 a heavy fog pervaded the atmosphere so that it was impossible to look in any direction but a short distance. The train was put on the move at 7 o'clock a. m., and the most dangerous part of the glacier, the top of the fourth bench, was laboriously approached. The packed snow was used as a bridge, and in this way the train crossed crevasses from 6 to 15 feet wide and thousands of feet deep.

Now and then the horses would plunge and drop through one of these treacherous bridges, but before proceeding far would catch themselves with their fore feet on the ice. Then the pack would be undone, the ropes placed around the animals, and by this means they were saved.

Finally all of these terrible obstacles were overcome, and the top of the fourth bench, where the crevasses began to get narrower and less numerous, was reached. From the point named good time was made. From the fifth bench the course was northeast, in order to use the packed snow to proceed on. By this time the rain had turned into snow and it grew colder and colder as we proceeded toward the summit. An ice-cold wind blew down from the summit, cutting the faces of the party very badly. Occasionally the fog would clear away, which would give us a chance to see the top of the summit and travel in the right direction. When the top was finally reached a fierce snowstorm was encountered. A 3-mile drive brought us out of the storm, where the blue sky could be seen and the men could feel the genial rays of the sun once more. Keeping to the right and away from the crevasses, we descended into the Klutena Valley. By 3 p. m. the pack train reached camp, and the trip, which up to this time had been thought an impossibility in summer, was successfully accomplished. Camp was established about 1 mile from the foot of the glacier, where the horses were turned loose after being unpacked, and allowed to graze. This trip was made in twenty-nine hours. This camp was made on the left of the Klutena River, in a valley about 2 miles wide and 4 miles long. In this valley was found some grass, but other vegetation was poor. There is no timber in this valley, and alder brush was utilized for cooking purposes.

August 8 our party, consisting of 6 men and 14 pack horses, left in the morning for the Twelve Mile camp, 4 miles farther down the Klutena River. It is called the first timber, because

here is where the spruce makes its first appearance. At this point Messrs. Schrader and Mahlo, myself, and 4 men and 9 horses remained. It was the intention of the party to take up work from the summit. On account of the weather, Mr. Schrader was compelled to stay overnight on the glacier, in company with Private Hallett. Mr. Mahlo and assistants arrived in camp about 8 p. m. Private Gardner utilized his time in gathering flowers and pressing them. On August 10 the weather was clear and still, and the air was filled with mosquitoes. The valley was measured almost to the Twelve Mile camp, and Mr. Schrader finished his work on the glacier. On August 9, 20 stranded miners passed the camp; most of them were penniless, having lost all they possessed in the rapids of the Klutena River. August 11 camp was broken at 7 a. m., and we proceeded to cross several side channels of the Klutena until they came to the main stream. Here the Klutena takes her course near a steep bluff, and her waters are swift and deep. At this season of the year the river was big enough to carry any kind of a boat. In the latter part of May this same stream, when visited, was insignificant in size. By partly swimming and partly wading, the opposite side of the river was safely reached.

In due time Twelve Mile camp was reached. This camp is situated on the left bank of the river. Here the valley spreads out to a considerable distance. There are several lakes west of this point, where beaver can be found. At this point also the first boats were built. The hills about 2 miles west are covered with good timber, some of the trees being 2 feet and more in diameter. It having been learned that the commanding officer had just broken camp, and as the provisions were now rapidly diminishing, we decided to follow the main party to the next camp, as it was only 3 or 4 miles farther down. Packer Kahill was left behind on account of a sore foot, which was so swollen that it was impossible for him to move. Keeping near the bluffs on the left of the Klutena, we traveled over several steep ridges until we reached a flat cut by numerous mountain streams. These streams are easily passed, although one was quite wide and deep. The valley was soon crossed, and in order to avoid the river the party took to the bluffs. As the trail was pretty rough, considerable trouble was experienced with the horses. Forest fires were also encountered, which became very annoying on account of heat and smoke. Camp was finally reached in an open place. August 12 Mr. Schrader, Private Gardner, Private Hallett, Mr. Mahlo, and Private Bench, taking with them 2 pack horses, started back to Twelve Mile camp in order to connect with their work. Private Garrett and myself remained in camp No. 2 to herd the stock. Near this camp we found a beautiful lake, about 2 miles square, with a little island in the center. Large quantities of fish, apparently of the trout variety, were discovered in this lake. The party dispatched to Twelve Mile camp returned at 3 p. m., August 13, and on the day following, the trail being found in good order, with the exception of fire and smoke, we broke camp about 11 a. m. Owing to the moss being afire, the feet of the animals were badly burned, and great difficulty was experienced in keeping them from being stampeded. Some beautiful valleys, covered with an abundance of grass and shrubs, were crossed during the day. Flowers and berries, especially wild currants, were found to be growing in every direction for several miles. Occasionally different kinds of butterflies could be seen playing in the morning sun and trying to catch each other. The bumblebees were busily engaged in gathering up their food, and mingled with the monotonous hum of the bumblebees were the sweet notes of numerous birds. In fact, everything was alive and seemed to be doing business.

The transition from this little paradise into a mass of burning timber was not a pleasant experience. A barren ridge was passed over, on which it was difficult to find the trail, as the marks and blazes had entirely disappeared. After having covered a distance of about 5 miles, camp was established at about 5 o'clock in the afternoon. August 15 Mr. Schrader and myself went up the mountain to take a picture of the lake and its surroundings. Reaching a height of about 600 feet, we saw spread before us an impressive panorama of the whole valley and Lake Abercrombie. Camp was again broken at 2 p. m., and after crossing a very swampy piece of land the timber was reached Here the progress of the party was suddenly stopped by a large-sized glacier stream, a tributary of the Klutena. This obstacle successfully crossed and a trail hit on the other side, trouble was experienced on account of the timber, which was burning, falling, and blocking the trail. Notwithstanding these obstacles, the head of Lake Abercrombie

was soon reached, and camp was made in the immediate vicinity. At this point provisions were sent down the lake by scow to Klutena City, a camp at the foot of the lake, in order to give us a chance to travel light and make good time. Camp No. 5 was broken at 2 p. m. August 17, and we reached Cranberry Marsh, 10 miles farther down, at 10 p. m. This camp is situated near Salmon Creek, and has about 50 tents. A good deal of hay is put up here by prospectors, as it is a fertile spot and adapted to cattle raising. Lake Abercrombie is about 23 miles long and from 5 to 10 miles wide. Fish, ducks, and geese are to be found in abundance in and about this lake, into which the Klutena River empties. The entire valley is fertile; vegetables can be raised, and cattle raising, if properly managed, could be made successful. The river leaves the lake at its foot, and after a run of 37 miles joins the Etna or Copper River. The next camp reached by the party was Klutena City, situated at the foot of the lake, 15 miles distant. This is a big camp, of about 100 tents. It is about 200 yards below the town and on the left bank of the Klutena River. Here we were provided with provisions, which had been previously sent to this point by scow. Considerable difficulty was experienced at this point by our party on account of the horses straying away. I met here several old acquaintances from over the glacier, who informed me that a great many miners would winter over, as some of them had provisions enough to last them for the next three years. Other alleged prospectors were dissatisfied, as they had not discovered gold by the bushel. A good many, I think, never saw a mine and would not know gold if they found it. We heard nothing of strikes being made on the head of the Tonsena River, although "colors" can be found in any stream. August 24 Messrs. Schrader, Mahlo, Garrett, Gardner, and Packer Kahill reached camp.

West of this camp is a high mountain, from the summit of which the Klutena Valley, Mount Drum, and Mount Wrangell can be seen. August 28 camp was broken about 9 o'clock in the morning, and by 2.30 p. m. the head of the rapids of the Klutena River was reached. At this point the river forces its way through narrow canyons. The volume and speed of the water is tremendous, the velocity of the stream being about 10 miles an hour. A number of people have lost all in this river. At this point is a camp of about 60 tents. Cox Landing was reached about 5 p. m., and here camp was made. Near this point is a spring of excellent water, called Beaver Spring. At 7 a. m. August 30 camp was again broken, and an attempt was made to reach Copper Center, 12 miles distant. This is the main camp on the Klutena River. The trail is very deep and runs up the bluffs at the height of about 600 feet; on reaching the top of the bluff the trail runs on the left side, and parallel with the river, from which an excellent view can be had of the surrounding country. One can see the basin of the Copper River, and still farther can be discerned Mounts Drum, Sanford, and other important points. Camp was reached about 5 p. m. About 2 p. m. on August 31 we again started on our way to make connection with Corporal Heiden and party from Valdez. One horse accompanied the party. This animal was tied to a long rope and held by one man while three men handled the boat.

At a given signal the boat was started and the animal driven in. As the current would carry the horse down pretty fast the man with the rope would slack up accordingly, and the animal would land about 200 yards below the landing place. Camp was again broken at 8 a. m. September 1. We followed the bluff of the Copper, cutting our way through heavy underbrush, but were finally blocked by deep ravines. It was therefore decided to descend the hill and follow the river bed as much as possible. Camp was established at 7 o'clock in the evening. September 2 camp was again broken, and by night an Indian camp was reached. These Indians live in well-constructed huts about 20 feet long and 16 feet wide. They are built out of poles about 6 inches thick, which are tightly lashed together with willows. This frame is then covered with spruce bark and moss. The door, which looks like a box, is about 3 feet high and 2 feet wide, and therefore causes a grown person to enter the cabin in a stooping position. The interior of this structure is roomy and light, which latter is caused by an opening in the roof. This is also used for the smoke to escape, as the fireplace is exactly under this opening. On two sides of the room benches are put up, which are about 3 feet wide and 3 feet in height. These are used for sleeping purposes. Little partitions are put up for their dogs. A little round opening, and right opposite the door, indicates the entrance to the bath house. Asked about the rivers ahead

of the party, it was found that the first one was called by them Kotsena, and not Tonsena. They knew nothing about Tiekell River. For every little stream they have a name, but, strange to say, no names for the mountains. Mount Wrangell is imitated by puffs of smoke.

September 3 several channels of the Copper River were crossed until the expedition came to the foot of a steep bluff. As at this point the river shoots against the bank we were compelled either to build a trail up the hills or to try and get around the foot of the bluff. After numerous difficulties met with during the day we went into camp. On the following day our party worked its way over two high bluffs, which we followed for several miles. We then descended into a flat about 5 miles long and several miles wide. On September 5, 6, and 7 considerable progress was made without any serious misadventures. Camp was again made on the evening of September 7. September 10 the Tonsena River was reached at a point several miles above its mouth and camp was made. On the following day an attempt was made to cross the river by boat, but it failed. At this point I washed out eight to ten colors of gold to a pan.

September 12 and 13 were utilized in building a raft with which to cross the river. It being completed, the pack animals were brought to the river side at the point of embarkation and unpacked. The animals were driven into the river, and after battling with the rapid stream were safely got across. The members of the expedition then embarked on the raft. No sooner, however, had we fairly started than the raft drifted onto a bar. The raft was soon got afloat again, but the current was so strong that it drifted quite a way down the river before it got into the main current. Notwithstanding all the efforts of those on the raft, it was propelled by the strong current against the bank the men had just left and was carried with incredible swiftness past islands, bars, and bowlders. Propelled in this way, a steep bluff was approached, with some timber near the banks. At this point I, holding a rope, tried to make a landing. No sooner, however, had I touched the water than I was hurled around and over like a cork. I had to let go of the rope, and swimming, now on back and now on belly, succeeded in pulling myself up by getting hold of a root. Private Garrett, who had jumped in to help me get the rope fast, was lucky enough to get out. The raft finally stranded farther down against some driftwood. By this time Private Garrett, who had got off the raft farther up by catching hold of an overhanging tree, came in, he having crossed the river on a mule. At this juncture intelligence reached me that Private Archer had been drowned. After many desperate struggles, the cook of the expedition succeeded in throwing a rope to the parties on the raft, which he had fastened to a big spruce tree. Now, as everything was wet on the raft, it became top-heavy, and it had to be lightered in order to float again. By the use of poles the raft was brought into deeper water and reloaded, it taking an hour to do this. The idea was to let the current drift the raft toward the shore by the help of the rope fastened to the tree. At the critical moment, just when the raft was swinging around, the rope slipped. An attempt was made to catch the rope, but it did not succeed. To our despair the raft floated down the river and disappeared in the darkness, carrying a number of men with it. Suddenly a voice was heard, which proved to emanate from Private Bench, who had jumped off to save himself. He was pulled ashore, and the opinion was expressed that most of the men on the raft were lost, on account of the darkness and because some of them could not swim. Thus a terrible night was passed. As soon as day dawned the men on the raft were searched for. Following the river, a blanket was observed and several other things on some drift. After some loud shouting the cries were answered and the people who were on the raft were located. They had all reached the shore safely.

As the provisions had all been lost, the situation of our party was now critical. As good luck would have it, however, Colonel Fritz, a prospector from Copper Center, was camped near by on the other side of the river. The situation of the party was made known to him, and he helped us out with flour, bacon, and potatoes. Search was made for Private Archer's body, but it could not be found. The 15th of September was spent by the men in drying their clothes, blankets, etc., and pulling such stuff out of the driftwood as was discernible. To add to the distress of our party, intelligence reached them that Private Hallett had lost the provisions which he had taken with the pack animals, about 40 pounds in all, in crossing the river, and had had a hard time to save himself.

September 17 was spent in cutting a trail a distance of about 7 miles. The following day it was decided that it would be necessary to get to the cache of the expedition located at Taral as fast as possible, a distance of about 37 miles through an unknown country. By climbing some trees a ridge running parallel with the Copper River was discovered. This ridge was followed for 2 miles. Here a steep canyon, through which a swift mountain stream was making its way, blocked our progress, but finally a place suitable for crossing was discovered. The distance made this day was about 8 miles. The Copper River is about 2 miles to the left at this point, and its banks are very rough on account of the many canyons. On the following day an Indian trail was struck running south 80 degrees east, and in the same direction in which we were traveling. Following the trail, a place was finally reached which allowed us to get a good view of the Copper River. In the distance could be seen some Indian houses down in the valley. They were made to understand that we were hungry, and the chief furnished some salmon freshly caught and some dried fish. We returned the hospitality by giving the Indians all the tobacco I possessed. About 7 miles was made this day.

Camp was again broken on September 20, and as we were traveling through a low country the party had to contend with many swamps. We passed about ten lakes of different sizes crowded with ducks. Camp was made about 4 miles distant from Taral, after covering a distance of about 9 miles. On the following day, after traveling a few miles, our party, by keeping itself on the edge of the bluff, could see Taral clearly. Finally we arrived at the river, where we found an Indian house, and in which we were able to obtain some hot tea, which was served in nice, clean cups. The cache of the expedition was found to be about 1 mile farther down the river. It consisted of 100 pounds of flour, 50 pounds of beans, 50 pounds of bacon, some fruit, and some onions.

September 22 was utilized in prospecting for a trail. The following day a trail was cut up the bluff, near the right of the camp, about 1,200 feet. About night the top of the trail was reached. On returning to camp several prospectors were met who had come over from Taral, and who informed me that it would be simply impossible to get my stock through on account of the high mountains and numerous canyons. Wishing to convince myself, accompanied by Private Gardiner and an Indian I traversed several miles until I arrived at a deep canyon, the sides of which were very steep and at an angle of about 45 degrees. After prospecting thoroughly the country I decided that it would be impossible to get the horses through. It was now decided to abandon the stock and reach the Kotsena by boat. The horses were left in charge of the Indians at Taral.

Considerable time was now spent in placing the stock and in arranging other necessary details before proceeding down the river. One of the incidents worthy of mention in this part of the itinerary was my encounter with a squaw with a babe in arms, the latter being named "William McKinley," in honor of the President, and wearing an image of the chief executive of the nation about its neck. A boat having been secured September 27, camp was finally broken and our party embarked. Kotsena was reached by 5.30 p. m., a distance of about 30 miles. Here was found a camp with about sixty prospectors and the provisions which had come down by boat from Copper Center. At this point Mr. Schrader became convinced that this was not the Kotsena; therefore the camp was moved 6 or 8 miles farther down to another river. The night was beautiful and the aurora borealis illumined the sky.

About 4 p. m. of September 29 the expedition got into the next river and went into camp. September 30 I went up the river with Mr. Schrader to investigate the country. Following the stream for several miles, we arrived at another body of water coming south and joining the first one. Mr. Schrader followed the first and larger one, while I investigated the latter and smaller one. For several miles I advanced and followed the stream, which was making its way through a narrow and steep canyon. Seeing that there was no connection with the divide, I returned. Mr. Schrader had no better luck, as the stream he had followed took its source from a large glacier. This valley, it appears, is not connected with the Lowe River Divide, and Mr. Schrader decided to proceed up the Tasnuna.

October 1 the boat was reloaded and the expedition left for the Tasnuna, which we reached

about 1 p. m. This valley is about 10 miles wide and can be seen about 15 miles up the river. October 2 was spent in finding a possible route for the progress of our party. It was decided to take the right bluff, as the glaciers would place insurmountable obstacles in the way. At this point Mr. Mahlo was taken down the river, by the order of Mr. Schrader, on account of his physical condition. Shouldering our sleeping bags and provisions, such as we had, with my men I made for the trail. After traveling about 1 mile I was seized with pains in my back, which increasing, I decided to return. Permission was received by me to proceed by boat, as it was decided that I was not able to go over the trail. Camp was broken at 8 a. m. October 5. The Bremner River was passed, coming in from the left, and at 1 p. m. the Bearst Canyon was passed. Following the main channel of the Copper, the head of the rapids was reached about 5 p. m. Here several prospectors were found. This is a poor camp on account of the scarcity of wood, which only grows in small quantities on Miles Glacier. The latter at this point has thrown some large granite blocks into the passage of the Copper; therefore the rapids. There is no boat, it is thought, that can live in these awful swells unless carefully handled. Even then it is dangerous. Nevertheless, Captain Abercrombie shot three of these unmerciful rapids. Most of the people line their boats down, but only about two out of five meet with success.

I succeeded in getting my boat down in one hour and forty minutes, and was ready to pass the Miles Glacier. During October 7, tons and tons of ice broke off Miles Glacier, which caused a noise like thunder and made the swells of the river almost reach the camp. In the morning the bay was found to be blocked by ice. Only to the extreme right was there an opening sufficient through which to navigate the boat. By carefully navigating the boat and running occasionally against some ice blocks, the glacier was successfully passed and Childs Glacier approached. This glacier is dry, because it does not throw any ice. There are some pretty high swells along this glacier, and as the current ran about 8 miles an hour the boat was sucked with the speed of an arrow. The next day Alaganik was reached. October 9 the party left Alaganik, and reached Orka about 10 a. m. October 10.

In concluding my report I recommend that provisions should be put up in 50-pound double sacks, the outer one strong enough to stand some wear and tear. The reason is because, on account of the irregularity and sizes of the packs, a good deal of time was lost on the trail in repacking the animals very often, which could have been avoided had the packs been more regular in size. Not alone this, but the horses got lame and sore for this reason.

Fruit is an important article of food for a person in Alaska. As this article will keep a person in health, a good deal of hardship and work can be overcome by the traveler thus supplied.

FROM PORT VALDEZ TO COPPER RIVER, DOWN THAT RIVER, THENCE TO PRINCE WILLIAM SOUND.

By Guido J. J. RAFFERTY.

My instructions were to explore practicable routes or trails to the interior. My starting point was Port Valdez, which I left May 3, 1898, at 2 p. m. Including myself, five men comprised my party, namely, W. E. Goodman, jr., Peter Harrington, John Curran, and C. H. Kuhlman. The expedition carried with it three Yukon sleds loaded with thirty days' rations and sufficient bedding, clothing, and foot wear to last until in the fall. It was the intention of our party to remain in the interior until the expedition had completed its work. We were to join the main party at some point on the Copper, on the arrival of the Government pack train, which was at that time daily expected from Seattle. My instructions were to press on with all haste to the Copper River by the Bates Glacier, thence down the Tasnuna, crossing the Copper on the ice, then up the Bremner or Tetehana to its source, and thence overland to the head waters of the Chettyna. Here I was to send back two of the party, or more, if I thought necessary, for supplies, which were to be cached at the mouth of the Tasnuna.

For five days previous to starting our expedition we experienced a continuous snowstorm mixed with rain, which made the sledding the hardest kind of work. Each sled carried 300 pounds, drawn by two men, thus making 150 pounds to the single man. This proved to be about all that each man could manage. On reaching the lower limits, or foot of the glacier, the route was found to be blocked, and further progress seemed impossible, owing to the fact that a small lake had formed from the backwater of Glacier Creek, which deeply covered the trail for a radius of 200 yards. To leave the old trail and travel in the soft snow, even without a load, was impossible. The water reached above the hip boots of the men, making it unsafe to wade with a load. Rather than return to camp we joined with some prospectors who were going on in cutting a channel through the snow. By this means the water was allowed to escape sufficiently to permit the men to pack their loads to the glacier. Here the loads were reloaded on the sleds, which were hauled up to the first bench by means of a block and tackle. The second and third benches were passed over in the same manner. The top of the third bench was reached at 10 p. m. As the men had no means to cook a meal, a lunch was made of corned beef and crackers, while we slept in the snow in our bags without tent or fire to warm us. At 4 a. m. we were again en route, passing many tents and caches along the trail and quite a number of prospectors who were moving goods toward the summit.

At 4 p. m. Lieutenant Preston's camp was reached, at the foot of the fourth bench. Here was found an oil stove, on which was made some coffee, and bacon fried. The next morning at 1 a. m. we started for the summit over the crust with half a load each. Landing the loads on the summit, we returned to camp, reaching there at 4 p. m. The summit was lined with prospectors hauling their goods forward. Caches were made everywhere along the route; goods were piled up with nobody to guard them, and yet nothing was found missing and the best of order prevailed.

On May 6, at 3 a. m., we were again under way, but I soon became convinced that it was impossible for me to reach the Copper on sleds, as the snow was fast disappearing on the north side of the glacier. On arriving at this conclusion I sent Goodman back to Valdez with a request for 300 pounds more of provisions, while I continued on with the loads. The stretch across the fourth bench is a gradual ascent of 8 miles to the foot of the summit. A cold wind was blowing at the rate of 45 miles an hour, making it necessary to keep closely bundled up. The wind blistered the faces of my men and made progress very difficult. The trail was filled with snow as fine as flour, forcing us to leave it in many places and take to the crust, which, while it carried our weight, was very rough and uneven, as it had been whipped into wave-like drifts that caused a jerking motion which severely galled our shoulders. As all the canteens on this trip had been emptied, ineffectual attempts to secure water from the several camps were made. Water was subsequently procured by melting snow over an oil stove or over a wood fire.

Wood is not plentiful on the glacier, and on this particular trip a famine prevailed on account of the big storm, which lasted on the summit for eight days previous to starting, and no opportunity was had to make a trip to the timber, 20 miles distant. Wood was quoted at 15 to 20 cents a pound, and little offered at that. On the night of May 6 our party camped on the summit, and, having neither oil nor wood nor stove, I made an arrangement with a man to feed his party of six for the privilege of cooking for my own party of four. I did not take a wood-burning stove because I was already loaded to the limit when I left, and no oil stoves were to be had. I knew that once in the timber, or across the glacier, all our cooking could be done at camp fires.

It is my judgment that, if one goes properly prepared for the trip, many of the disagreeable features of that particular part of the journey can be easily eliminated. Our greatest discomfort, was caused by a lack of knowledge as to what was required for the trip. We found an oil stove to be an absolute necessity. Most people passed over the glacier with from 1,500 to 2,000 pounds of an outfit, with no power but human muscles to move it up the steep incline. A load weighing 150 to 200 pounds was as heavy as most men could haul upgrade. Many were not equal to more than 100 pounds. This involved going over the same road fifteen to

twenty trips to move a cache 5 miles forward. This is considered a fair average trip. On the other hand, a horse would only cost $20 at Seattle, or, freight added, $60 at Valdez, and could haul 1,200 to 1,500 pounds, besides making twice the distance. Again, the trails were badly laid out. The inclines up the benches were from 15 to 20 degrees from the horizontal. So steep were they as to make it necessary to use a block and tackle. If switchbacks were put in, or the least attention paid to grade, twice the weight of the ordinary load could have been drawn up by man or beast. This was especially true of the last pitch, where it was all but impossible to get enough men on a sled to haul up 300 pounds. It took four men two hours of hard work to get 250 pounds up the last pitch. The price of horses on the trail ranged about $400 for an 800-pound pony, and this, too, when the time during which they could be used was drawing to an end. Another point that may be of interest to people contemplating this trip is the matter of clothing and foot wear. The ordinary clothing of civilization is all that is required. Sheepskins and fur clothing sold at a heavy discount on eastern prices along the trail, and prospectors who had had great experience in the work claimed that there was no necessity for furs. Foot wear, it seems, was the most troublesome problem. All so-called waterproof leather, without exception, lets in the snow water after being used a short time. Light lumbermen's rubber shoes with leather uppers are preferable to walk in.

It is necessary to take these to bed to keep them from freezing, as they easily break when frozen. German socks, lumbermen's rubber hip boots, snowshoes, and ice-creepers are an indispensable part of an outfit. The creepers are constantly worn when pulling on a hard trail. The constant strain of hard work, loss of sleep owing to the necessity of working nights on the crust, combined with half-cooked or cold victuals, proved to be a severe trial for the temper of the most of the men who cross this trail. Bitter quarrels arising between partners, or "outfits," as they are termed, proved to be a feature of the trip. The most trifling causes precipitated quarrels, serious and troublesome to those engaged, and amusing and trifling to spectators. When conditions of partnership became unbearable an arbitrator was usually called in and the effects of the disputants were divided as nearly equally as possible. Sometimes an exact division was demanded. This sometimes called for the sawing of a boat in two or cutting a tent through the middle. In one instance during one of these quarrels a member of my party was called upon to act as arbitrator. On his refusal to serve, the litigants went at it themselves and ended by dividing a small grindstone into three pieces. In another case four oars remained. Each man took one and the fourth was broken so that none of them should get any the best of it.

May 7 found the party in "Camp Twelve-Mile"—12 miles from the summit—where timber and water were found to be plentiful. On the following day the expedition started on a soft crust, but only proceeded 1½ miles from camp, finding it impossible to go farther. The snow was now going fast, the creek was rising, and everything indicated a final break-up. Another start was made at midnight, on a poor crust for travel, and the men were again compelled to return and await Goodman's arrival. The latter reached camp on May 9, having been forced to abandon his sled 2 miles from camp. He brought with him a letter from Captain Abercrombie ordering the expedition to push on toward the Copper and abandon sleds as soon as water was reached of sufficient size to float a raft. There were 12 inches of water in the stream on which we were camped, but the creek was bridged in many places by snow, rendering navigation impossible.

The bare ground cropped out in many places, showing the surface to be a glacial deposit. The base of the mountains was covered with a light growth of timber; the summits were bare of any vegetation. By working at night on the crust we managed to get the outfit 7 miles farther on, each man hauling 75 pounds. The next two days we only advanced 1 mile, each man only hauling half a load. By this time the snow was extremely rotten and was underlaid with water. When one of the men broke through, something which happened every few yards, it was like being in quicksand. Then it required great exertion for him to get out again. It took ten hours to make 1 mile.

An attempt was made by the men to make a trail of their own. Four of them would start out in single file on web snowshoes, each taking his turn at the front. The snow contained so

much water and loaded the shoes so heavily that a man needed to be relieved every twenty minutes. Then he was allowed to drop to the rear of the line, where the walking was much easier. To go and come on this trail 3 miles required six hours, and even when the trail was opened it would not hold up a man without snowshoes, nor his loaded sled. If it froze through the night the trail remained; if the snow melted then all labor was lost. The sun at this period of the year began to melt the snow very early in the morning, so that if a man was caught on the trail after 7 a. m. he was likely to have a serious time in getting back to camp. In fact, travel up and down the trail was entirely suspended between May 10 and 15, and preparations were made to build boats. Most of the prospectors along the trail had tools, nails and calking. Our party, however, had no tools but an ax, which made its members anxious to reach the lakes, 7 miles below, where sledding was still good and the ice about 3 feet thick.

At last all hope was given up of reaching the lake on sleds. The valley was covered with water and the snow, even on high ground, too far gone to allow hope for any benefits from frost. The days were now getting hot. On May 16, arrangements were made with two California prospectors by which members of the expedition were to trade their labor for the use of the tools of the former, with sufficient calking and nails added to build a boat. Timber was very scarce. Some timber was found that would square 7 inches, and sawed out 350 feet, sufficient to build a scow that would carry both outfits. When at last the men of our party were ready to begin building the scow the prospectors, it was discovered, had neither pitch, plane, square nor ripsaw. The ripsaw and plane were indispensable if the boat was to have joints that would keep out the water. All the camps within a radius of 2 miles were visited for the purpose of trying to buy or borrow the tools needed. But every one was building boats or was going to build one in a day or so and would not part with his tools. At last a man was found who desired to sell his outfit at auction. He wanted an auctioneer, and agreed to build the boat if I would serve in the capacity of vendor. Notices were sent out to the surrounding camps and the sale took place the following day. It took me four hours of pleading to dispose of the lot. About twenty-five men were present and bidding was brisk. Flour brought $20 per hundredweight; sugar, $30; rolled oats, 76 cents per pound; salt, 35 cents a pound; condensed milk, 75 cents per can. Heavy clothing sold at a sacrifice. Woolen socks, German socks, rubber foot-wear slightly worn, brought three times their cost.

It took two days to build the boat, and on May 27 we started for the lake. The boat was named the *Oscar*, and as it was found on starting that it would not hold the outfits of both parties, it was arranged to carry part of the load in another boat going down, with me working my passage at the helm. The trip down was not without incident. An occasional sand bar would be encountered, and when these were met with the men relieved the boat of its weight by pushing her over. At one point a snag was encountered, breaking a hole in the side of the boat above water line. This was repaired. At another point the boat was swept into some overhanging trees. By this means Peter Harrington was once knocked into the stream. The lake was reached at a distance of about 12 miles; it was found to be full of ice, which had just commenced to break away from the shore. The ice was 18 inches thick, and when struck with an oar near the edge would separate into long pieces like icicles.

Under the warm rays of the sun and the wind the ice melted rapidly, and after a sojourn of two days the expedition started to break its way through. This was accomplished by dragging the scow with twenty men on the line and three men in the bow with pike poles, who broke or shoved off the floating cakes. Tied behind the scow were ten boats belonging to the men working on the line. In this way the foot of the lake was reached on the third day out. This lake is from 1 to 4 miles wide and about 30 miles long, and was named Lake Abercrombie by the men who first went through on sleds. The discovery was now made that instead of the lake being drained by the Tasnuna River it was drained by the Klutena, which enters into the Copper 193 miles above Alaganik and 81 miles north of the Chettyna. The outlet of the lake has always been a favorite camping ground for the natives. Quite a clearing had been made by them in cutting wood. Several summer shelters of spruce bows and poles had been built so long ago as to have fallen into decay. Two caches built of 6-inch poles were also discovered. One contained

a lot of furs and a gun. The other cache was empty and showed better workmanship. It is possible that this cache may have been built by a white man, who perhaps spent some time here years ago. A clinker-built bateau was also found tied to the trees with willow withes. The boards were ¾-inch stuff, the ribs 2 inches square. The length of the boat was 20 feet, and it carried a 30-inch beam. The depth of the boat was 2 feet. She had evidently been built many years previous and was badly sprung and weather-beaten. The nails were square cut and of steel. On investigating further a cache of clothing was found tied to the end of a long pole which was shoved up under the overhanging branches of a spruce tree. The clothing was wrapped in a black slicker coat and had not been untied for many years. The covering had rotted away and the contents parted at the touch of the hand. I concluded that some venturesome white man had come up the Klutena many years before and, having spent some time hunting, cached the clothing; then having gone out on the ice, for some unknown reason he had failed to return.

On the afternoon of June 1 the expedition started down the Klutena. The river at this point was close to 100 feet in width, 5 feet deep, and ran as smooth as a mill pond for 5 miles, at which point it divides into several channels. Here were encountered rapids, and boats had to be lined for a short distance. This could have been avoided had the expedition known that the right-hand channel was the proper one for them to take. Camp was made that night at the beginning of the big rapids, which practically extend to the Copper, 20 miles below. Many prospectors were found camped in this vicinity, hesitating to go on for fear of being swamped or their outfits lost or ruined by the water, which was a common occurrence. Rafts that had been used above were wrecked and abandoned to the number of thirty-six in the first few miles.

At this point the river descends in leaps and bounds over bars and bowlders, with a deafening roar that has anything but a pleasant sound for a man who must risk his life and his precious outfit on its treacherous waters. Men who had faced the storms of the glacier for weeks, living on cold victuals, overcoming obstacles that would discourage any but the most determined, with never a thought of turning back, weakened at the rapids. All sorts of plausible excuses were given for going back. The number of men with sick wives at home or urgent business to attend to suddenly became very numerous. All were loath to acknowledge that they had decided to return home for the reason that they met with little sympathy along the trail. To go back meant a lack of courage to go forward, or, in the parlance of the trail, a man who went back lacked "sand" or "got cold feet." Many cached their goods rather than risk the whole of them on the river, taking a few months' provisions with them for a prospecting trip, and then lined their boats down. Others took the safer method of packing on their backs, by which a man could advance with an outfit of 500 pounds just 1 mile a day. Two outfits had horses, and they were exceedingly fortunate, for the traveling on the bench above the river was good. It was scarcely necessary to cut a tree the whole distance to the Copper, and the men who had horses got far in advance of those who depended on boats as a means of transportation.

The boat was here abandoned as being too clumsy to make the trip safely, and the expedition joined forces with the men who had carried a portion of its outfit from the place where the boat was built. The goods were to be transported to the Copper in their boat, for which assistance the members of the expedition were to join in helping line the boat down the rapids. In the thirty days since leaving Valdez the weight of the goods had been much reduced, and with that belonging to the other party gave the boat a load of some 3,500 pounds, most of which belonged to the other party. The boat was well made and well shaped, broad of beam and deep. I thought that with seven men to handle her good time could be made without endangering the cargo. Six men held the rope fastened to the bow and walked along the bank or, as was often necessary, waded in the stream. The boat was allowed to drift sternforemost to offer the least possible resistance. One man remained in the boat, and by means of a long pole kept her out from the shore and off the rocks. In this way the expedition had proceeded about a mile when, in spite of their efforts, the current swept the boat onto a wrecked raft, knocking a hole in her bottom, partly upsetting her crosswise of the current, so that it swept over the goods with such force as to cause me to hesitate about unlashing them for fear they would be swept into the river.

Even with the aid of ten other men who had gathered on the bank they were utterly unable to right the boat, so strong was the current. After spending an hour in the ice-cold water, a bridge was built from the raft to the shore and the goods rescued.

The next two days were spent in drying out. Excepting flour, beans, rice, and bacon, everything in the line of provisions was spoiled. This disheartening experience decided the man who owned the boat to dry out his stuff, sell it and the boat, and return to Nebraska. The crowd at the rapids was invited to the auction sale, for crying which I received the boat. It was decided that it would be safer to attempt to shoot the rapids, and a man was secured as pilot who claimed to have made the trip three times successfully. Nevertheless, the party came to grief on a rock in midstream. For a time, the space of a minute perhaps, they were hung on the rock, and would have been glad to escape with their lives, but were swept off by the current and hurled downstream, striking a dozen rocks before control of the boat could be regained. Finally they succeeded in landing it upon a bar, completely filled with water and 100 yards above the "bad rapids," as they were called, 8 miles from the Copper. The pilot went off downstream, while the members of the expedition packed the goods ashore and opened them out to dry.

Here I was tempted to give up the notion of reaching the Copper River by boat, but concluded, after discussing the matter with my companions, to give it one more trial. Another patch was placed on the bottom of the boat, the seams pitched and calked, and then it was successfully lined down the river, reaching the Copper without further trouble on June 9. About fifty men were camped here, preparing to go upstream. The expedition remained at Copper Center three days, taking observations of the country. Three of the party went north to Tazlena, by the trail along the river, to ascertain what the chances were of getting pack animals over that stream. There had been one bunch of horses taken up along the second bend, and these all swam the river when it was at its highest. From the bluffs back of Copper Center, at the mouth of the Klutena, the general aspect of the country as far as the eye could reach was that of a rolling plain covered with a growth of small spruce and cottonwood. On the upper benches the ground was covered with moss almost dry enough to burn and so dense that no glimpse of the formation could be had. Both the Klutena and the Copper cut their way through beds of gravel several hundred feet in depth. These banks, when tested for gold by an experienced placer miner, who was one of the party, invariably yielded a few colors to the pan.

It is my judgment that if it be the object of the Government to find a practicable route to the interior from the coast, it is hardly possible that a better one will be found than that starting from Port Valdez. The greatest obstacle along this route is the Bates Glacier; but in my opinion if taken in the proper manner and at the right time, the heaviest mining machinery could be transported over it, and after the summit, 4,860 feet above sea level, is reached there is found a grade to the Copper over which a man can haul 500 pounds to the sled during the winter months. In the summer there is a water route over which an experienced boatman, accustomed to rapid water, can take a year's provisions in one trip. Of the distance from the glacier to the Copper, estimated as 75 miles, more than 50 miles of the route is safe boating. Of the Klutena, 25 miles is a series of rapids, which are by no means an insurmountable obstacle. The fact that this part of the route was strewn with wrecks and many men lost their entire outfits I ascribe as chiefly due to the lack of knowledge on their part of how to construct or handle a boat. Of the hundreds of men along the river at that time there was but one who could start from the rapids and take a boat to the Copper with any assurance of escaping safely. Some men made one or two trips in safety, only to be wrecked the next trip. There was no lack of men to make the attempt, but 95 per cent came to grief at some place, there being a marked improvement as the men became accustomed to the dangers to be faced.

Owing to the melting snow making it impossible to get about, there were parts of the route likely to be followed by a pack train en route from the Bates Glacier to the Copper which I had no opportunity of examining. There had been horses taken over on the snow ahead of the expedition, and farther on I considered the route an easy one, with sufficient grass growing to furnish ample feed for stock. In the swamps hay can be cut for winter feed. Prospectors starting from the mouth of the Klutena for the head waters of the Copper or its tributaries

towed their boats loaded with 1,250 pounds, or even more, along the bank. Four or five men were on the towline, with one man in the boat to keep it off the shore. At times the steep gravel bluffs make it necessary to row across the stream, when the swift current would carry the boat downstream, sometimes a half mile below the starting place.

The long-expected pests, the mosquitoes, were out in full force during the stay at this camp, and the men were compelled to wear veils day and night, with gloves to protect the hands The ferocity of these mosquitoes I regard as something remarkable. The species found here is not the large, singing sort seen in the States, but a small, silent, business-like insect, sharp of bill, who touches the tender spot in a surprisingly short time after alighting. After making their appearance they never left the expedition for a day. The weather was so warm that the men stripped to their undershirts, the thermometer standing between 85 and 88 in the shade for a week.

June 13 the expedition started down the Copper, after having heard many hair-raising tales of the dangers ahead. Of four parties of prospectors who had gone down, three had been wrecked and returned a few days later for new boats and more supplies. It was reported that the water ran with such force as to sweep a boat onto a sand bar, turning it end over end. The river was close to high-water mark, with the current about 8 miles an hour. The expedition kept to the deepest channel, to avoid sand bars and make time. We stopped at "Stickwans" (Stephan's) village to interview the Siwashes, who were on the bank awaiting the coming of the salmon, which were hourly expected. The first three salmon caught were boiled in a pot over a camp fire. The Indians invited the members of the party to partake, and, while we wanted fresh salmon, we contented ourselves with taking a taste from the bone spoons to show our hospitality, as the natives were in such evident need of food. The Indians wanted medicine, which could not be furnished, the small stock having been lost on the Klutena, and as they asked for tobacco, all that could be spared of that article was given them. Stephan was on the other side of the river, and we were requested to go over and visit him, but declined on account of the swiftness of the current. The natives were glad to see the "Wastonman" (as the whites were designated), and gave the members of the party each a cordial hand-shake. The Indians curiously examined the boat, and in their broken English and Chinook expressed astonishment as to its size. Stephan's tribe was very highly spoken of by whites who had reached the river. They were reported very honest. Goods lost in the river were fished out, dried, and word sent to Copper Center as to where they were, if too heavy for the Indians to pack to that camp. Frequently visiting the camps, yet they were never known to take the smallest article without the owner's permission.

Resuming the voyage, the expedition passed groups of Indians waiting for salmon, who always hailed us, inviting us to stop. Some rough and rapid water was encountered, but, with two good men at the oars and steering with a sweep, the party got along nicely. At places the river was a mile in width, at others it would narrow down to a few hundred feet. Two boats belonging to prospectors were sighted at the mouth of tributaries. Another white man shouted to us and warned us of the rapids a mile farther below, down which we were advised to line our boat. The boat was landed above them, when it was found we could not walk along that bank, and we were forced to shoot them. These were the worst so far encountered on the Copper. Camp was made early in the evening at a salmon-catching station, where five Indians were found, who had had good success in fishing. Purchasing three fresh salmon, the expedition had its first meal of fresh fish. The Indians have a better knowledge of money than is usually supposed. Two quarters were given in payment for the fish, one a Canadian coin. This was carefully compared with the American quarter, and the Indian handed it back, asking for a good one in its place.

The Chettyna was reached at noon of June 14. Being unusually high, it carried a volume of water nearly, if not quite, equaling that of the Copper. It carried more sediment than the Copper, and was unfit for use. Camp was made on the south side of the Chettyna, only to be moved farther down, where the wind had more effect upon the mosquitoes. June 16 the expedition paid a formal visit to Chief Nicolai at his summer house at Taral, 2 miles below. It was

my intention at this time to leave the boat and go up over Nicolai's trail to the summit back of Taral, thence to the head waters of the White River, prospecting for a feasible route to the Yukon country. Near Taral were two men in charge of caches of prospectors who had come up the Copper and gone on up the Chettyna with light boats during low water. These men stated that parties leaving later were unable to make any progress, owing to high water, and had been obliged to camp 10 miles up the river. With the heavy boat I had it was folly to attempt the voyage upstream, and I hoped by getting a guide from Nicolai to make the trip over the trail with enough provisions to last until the coast was reached, or until the pack train reached the river with supplies.

At Taral Nicolai was hailed by the squaws when they saw the white men coming, but, fearing to compromise his dignity, he waited for us to make the advance. He did not comprehend my explanations until a copy of Lieutenant Allen's report was produced containing a picture of Nicolai and his wives, taken thirteen years before. I explained that Lieutenant Allen had written the book and made the maps. Nicolai warmed up immediately, and gazed for a long time at the first picture of himself he had ever seen. He was immensely pleased, and gave vent to his surprise and pleasure with long-drawn-out sighs. I again explained that this expedition was sent by the same chief that had sent Lieutenant Allen, and who ruled over as many people as there were trees on the mountain opposite; that they also came to see the country and learn how the "Stick Siwash" fared. Then Nicolai told how he liked all "wastonmen," how he had fed Lieutenant Allen and his party, who had "halo muck-a-muck" (no food) when they reached his winter house on the Chettystone. He also said the prospectors who had gone up were good "wastonmen," who "halo sauniced," meaning they neither fought with nor stole from the Indians. He invited us to his house, where we ate salmon off china dishes, drank tea from cups and saucers, and used knives and forks that would have passed muster in civilization. Nicolai then went over the details of Allen's trip with evident satisfaction. He related with much enjoyment how Lieutenant Allen had threatened to use force to compel him to accompany the expedition before he was ready, and how he had stood firm, throwing open his coat that they might shoot him the easier.

When questioned about the trail, Nicolai stated it would take fifteen days with a light pack, or twenty with a heavier one, to reach the head waters of the Chettyna. He firmly declined to furnish a guide, either for "chickamun" (money) or "muck-a-muck" (food), explaining that while the salmon were running the Siwash must stay at the river and fish, or starve when winter came. A month later he would go. The party returned to camp, accompanied by Nicolai, who was banqueted on beans, bacon, tea, and sugar, with a bannock baked in a frying pan. Not having provisions to last the expedition for a trip up the White River Pass, I concluded to remain at Taral for a time, awaiting word from Captain Abercrombie. The time was spent in prospecting the surrounding country. At this point the mountains come down on both sides to the water of the Copper River. The formation is slate. A few colors of gold were found to the pan at nearly all points along the river, and small pieces of pure copper were frequently found in panning for gold.

Between Taral and the Chettyna the Oostina Creek (as it is called by Indians) pours a torrent of water into the Copper. Efforts to ascend the banks of this stream to get to the summit in search for a pass to the coast met with poor success, owing to the precipitous banks of solid rock at places entirely bare of trees, leaving nothing for the climber to cling to. Taking back to a point where we could get onto the mountain, we followed the ridge up to where the stream forked, thinking we might cross above the forks. Here the stream was found to have the same steep banks as below, the water rushing over a smooth slate bottom and leaping down the benches 10 to 20 feet at a jump. At one place the fall was so great as to make the ground tremble, and the escaping spray looked like steam. The first impression gathered from the bluff, 200 feet above, was that we had come upon some sort of a volcano or warm stream rushing up from the earth. The attempt to secure a photograph was futile, owing to the inability to descend the steep banks.

Along this stream we followed a well-defined game trail, winding close to the bluffs. I think

no gold will be found on this creek, as the bed is narrow and the current swift enough to sweep everything before it. Taral Creek, as I have named this stream, empties into the Copper at Taral, having its rise in the range east of the Copper. In company of three prospectors I went up to its source, crossing the divide on the snow, which, notwithstanding the continued warm weather, was still 5 to 10 feet deep. Farther back to the east could be seen a snow-capped range. To the north was seen Mount Wrangell, from which smoke was issuing. Striking in at the head of another stream, it was followed down to the Chettyna at a point some 15 miles above the mouth. On this trip a good view of the rock formation was had in the gorges which had perpendicular walls. Copper indications were plentiful, the copper stain (malachite) showing up in the bluff walls without any apparent connection with lodes and having none of the characteristics of a vein.

Several veins of quartz were encountered carrying iron pyrites, as were two or three apparently low-grade veins of copper, some specimens of which were brought back to camp. While the white quartz veins were carefully examined for free gold, none was detected. The summit of this range, as well as at every point struck in the canyon, was covered with a deep moss, which made walking very tiresome. Every step resembled that of walking on a feather bed. On the night of June 27 water froze one-eighth of an inch thick; nevertheless, there were periods about this date when we were greatly pestered with mosquitoes. At this point in the itinerary word reached the expedition that Spain had declared war against the United States. No word having been received from Captain Abercrombie, I decided to order C. K. Kuhlman, the only soldier with the party, to take some provisions and make his way back to camp and report to whoever might be in charge. If no instructions were found at Valdez, he was to proceed to the nearest military post. Curran and Harrington, of the expedition, decided to attempt to make their way over to the White River, thence to the Klondike, buying enough provisions from prospectors going out to last them three months. Goodman decided to remain with me and go down the Copper River.

Wood Canyon lies 2 miles below the camp of the expedition at Taral. A strong wind blows up this gorge almost constantly. It comes with such force that it is very dangerous to go through it. No white man not acquainted with currents, it is believed, could take a boat through it during high water. The natives do not go through it except in very low water. It was impossible for me to get any idea of what was before me on account of the height of the walls above the water and the winding course of the river. Apparently it did not seem to me more dangerous than other waters that I had passed. Some years previous a canoe had upset and the whole crew, six or seven in number, were drowned. If a boat did upset, a man's only chance of escape was to swim the entire length of the canyon, 2 miles or more, as there was no possibility of getting ashore along the bluffs. This was no easy task, when it is considered that nearly all the tributaries of the Copper have their rise from glaciers. Finally some prospectors persuaded an Indian to steer a boat through at the first favorable time when there was a lull in the wind. This came one night, and all hands hustled so as to keep in sight of the Siwash, who, before starting, offered a prayer to the water god, bade good-bye to his wife and the whole tribe, tied a rope about his waist, making one end fast to the boat, and, with his copper-colored face literally white, started on the perilous voyage. Fifteen minutes later he landed at the mouth of the canyon, after having passed over as good a piece of water as any that had been met with on any of the rivers. It is impossible to sail, row, or tow a boat up the canyon during high water. It is safe to come down through it at any time when the wind does not blow too hard.

As much as has been said about the native's ability to handle a boat in the swift waters of the section named, I failed to find him equal to the average white man. The rivers are sacred things to the natives, so much so that they will not, and do not even like to see white men, throw a stone into the stream, for fear of making the water god angry. An ax or hammer is never used to drive a stake in the river when platforms are being built for fishing stations. A stone from the bank is considered the proper thing for this purpose.

In this expedition down to Taral were five men, three of whom had been wrecked on the Chettystone, losing their entire outfit and barely escaping with their lives. One wore moccasins

made of canvas, very much patched; another wore a pair of shoes whittled with a pocketknife out of cottonwood, while another had for a headpiece a hat made of cloth from a pair of cast-off trousers. June 30 camp was made at the mouth of the Bremner River, up which stream sufficient encouragement had been found in panning for gold to induce some forty or fifty men to spend the summer there. Some sluicing had been done, but no good strikes were reported. As the distance from Taral to Bremner River is about 50 miles, and the country is quite rough on both sides of the Copper, I saw little chance of getting a pack train through to Taral on either side. From Taral to Baird Canyon the river forms a sort of lake, some 20 miles long by 5 miles wide. Its local name is Tetchena Bay.

Several small glaciers were sighted as the expedition went along. At the upper end of Baird Canyon is a good-sized terminal moraine, back of which I supposed was a "dying" glacier. Baird Canyon was found to be a very smooth piece of water, the river narrowing down from the wide bay to a few hundred feet in width. The head of Abercrombie Canyon was reached at 3 p. m. July 1. One side of this canyon is formed by a wall of immense bowlders, the terminal moraine of the Miles Glacier. The bed of the river is filled with these bowlders, over which the waters of the Copper, confined to a narrow channel between the glacier walls and the bluffs of solid rock, go tearing through at a high rate of speed. I hoped to overcome this obstacle either by running the rapids or by lining the boat down the shore. On viewing them, however, I decided that we would be fortunate if we got through with an empty boat. Finally I portaged the load over a trail that ran along the face of the bluff on the right bank. In one place I passed over a snowslide that sharply pitched toward the river. A misstep meant almost certain death. At another point the boat went under a slide 20 feet in thickness, from which the water dripped as if from a wet roof in a tunnel. After portaging such goods as were indispensable, the remainder was abandoned. The boat was lined down, receiving such rough usage as to spring the timbers and cause it to leak badly. The next danger was from the swell caused by the ice breaking off from the Childs Glacier, which sometimes created such waves as to land a loaded boat 150 feet high and dry on the shore. The current swings directly toward the glacier on making the turn, and it required all the strength at hand to keep from being carried with it. The river was filled with floating ice, some pieces being almost the size of a freight car. That night camp was made at Alaganik. A row of 30 miles across the delta landed us at Eyak River. Eyak was reached at 2 a.m. July 6. Portage at this point was made over a canning company's tramway of half a mile to Prince William Sound, where we were picked up in the afternoon. That night the party was towed to Valdez Landing, which was reached at 5 a. m. July 7, accompanied by the boat which had made the trip from 12 miles beyond the Bates Glacier.

In my narrative of events there seem to be but two known routes from this section—one by Copper River, the other over Valdez Pass. The latter I consider in every way the more practicable for man, beast, or railroad. I met and talked with many miners who traveled up the river, and they found it a decidedly difficult road to travel. It was all the way up grade, with a most disagreeable climate, owing to the continued high winds blowing downstream.

RELIEF FEATURES OF THE EXPEDITION.

By Quartermasters Agent CHARLES BROWN.

I took charge of issuing rations to destitute prospectors August 5, 1898. I fed during the months of August, September, and October, 306 men. Of this number 121 were carried south gratis by the steamers of the Pacific Steam Whaling Company. All were practically without means. One hundred and eighty-five men paid for second-class passage, ranging from $5 to $25, to either Seattle or Juneau. Many left for the latter place, en route to other points in Alaska seeking work, with the intention of returning to Valdez upon acquiring new outfits. Improvements were made through the labor of those provided for in camp as follows:

Built smokehouse, 16 by 16 in the clear, 65 logs, which was a necessity, owing to the deteri-

oration of bacon through climatic changes; washed and resmoked bacon; cut 10 tons of hay; built stable 16 by 125 feet, consisting of 205 logs; cleared brush and timber from immediate neighborhood of camp; made footbridge over glacier stream running through camp; have now in collection a supply of fuel; built eagle house, 13 by 13 feet, 60 logs; hauled gravel for bottom of stables, roads, and footpaths; assisted in hauling lumber for the erection of relief station on glacier established by the Christian Endeavor Society of Valdez. Assistance was extended by sending saddle animals to the glacier to assist those coming over sick or lame on nine different occasions. The majority of men arrived here from their trip over the glacier in an exhausted physical condition, which required several days' time to recuperate.

One of the most marked circumstances of interest is the satisfaction prevailing in the minds of the prospectors. With the further advance of the season, and with the withdrawal of the discontented and "green" prospectors, a general higher hope exists as to the future. Prospects have been struck that indicate a rich mineral country, mining districts have been formed, and everything points to a general development throughout the country. The few that are now leaving leave behind their caches and start for the States with the intention of returning with pack animals. A number of men have returned to Valdez to build cabins for the winter, representing parties or companies left in the interior, with the intention of having headquarters here as a base for their supplies. Those remaining in the interior represent altogether the experienced miners and prospectors, those leaving the country being inexperienced and coming unprepared to meet the hardships incident to the work. A number of narrow escapes have occurred on the glacier trail, several falling in crevasses and were only rescued at great risk. One case in particular was that of John R. Herman, who on September 12 was one of a party of four who, while following in the rear, was suddenly missed by his friends. An immediate search resulted in finding him back some distance, having fallen in a crevasse to a depth of 40 feet, where he became wedged. On discovery, Mr. Fred Kimball, one of the party, traveled 12 miles for rope and assistance, and Mr. Herman was rescued after five hours' confinement, with many bruises, but without further serious injuries. The spot where the accident occurred had been safely passed by the remainder of the party, the crust of snow over the crevasse sustaining the weight of others.

The army ration has proved insufficient for the necessities of the men here, the climate and air inducing immoderate appetites, which the ration alone could not meet. Fish, in the greatest abundance, and huckleberries and salmon berries also in plenty, have materially swelled the ration and given a most desirable change. The scales of the commissary have been used very generally in showing the added weight of many prospectors, and it is a significant fact that practically none have lost flesh. The health of those reaching this camp has been throughout excellent. Fifty-four men have been treated by me for trivial ailments, such as colds, sore feet, lame back, etc., generally induced through unusual exposure and hardships, wading in cold water. All yielded to care and hot water, with the exception of one case, where the patient went to Seattle for treatment. Five were treated by the doctor for chronic ailments.

The opinion of old prospectors, who are practical miners, is high in regard to the mining prospects of the country, and it is this class which is now remaining in the interior and is actively prospecting. The per cent of experienced miners to the green men was about 15 of all those coming to this point. This estimate is based on information and inquiry from many miners here.

The per cent of those "grub-staked" was large, consisting of at least 60 per cent of everybody. Many of this class never crossed the glacier or made any attempt at prospecting. The average age of prospectors I would estimate as being about forty years, many men of old age being among the number and making a high average. Volunteers for carrying on the work on the summer trail have been numerous, and all have shown a disposition to make this the popular route into the interior. Through the assistance of these I have constructed a cabin 16 by 20 feet on the summer trail at what is known as Station 24. The opinion usually exists that this trail can be made into a safe, all-the-year route, with no glacier to cross. A natural prejudice prevails against using any trail where it would be necessary to cross a glacier. On the Valdez Glacier snowslides are in many places a source of danger, while the high winds so often

found there render the trail impassable. A case occurred on November 7 where a guide, John Bell, was lifted clear of the ice and carried several yards by the force of the winds.

On October 28 one mule and one gray horse, branded U. S., were shot. On October 30, while in course of building station No. 24, one black horse loaded with bedding reared up on the trail, and, falling, rolled down the side of the mountain, breaking his back, and it became necessary for Packer S. S. Lynch, in charge, to kill him.

On October 30 I received from the steamer *Rival* 60,000 pounds of hay, and from Captain Glenn, Twenty-fifth Infantry, 11 crates of bacon and 33 boxes of hard-tack. The steamer *Rival*, returning southward, took one man gratis.

There were taken into the interior during the month of August, 1,260 letters; in September, 1,001; in October, 1,977.

On November 7 the following men reached Valdez from the interior, viz: W. C. Bruce, of Tacoma, Wash.; Heber Smith, New York City; Oscar H. Peterson, Chicago; V. T. Malmgren, Chicago, and B. G. Levecross, St. Paul, Minn. They all return south with the intention of starting again for Valdez about February 1, 1899, with pack animals and outfits.

They report that coarse gold and nuggets have been taken on surface prospecting on the Tiekell River. A number of men are working on Manker and Quartz creeks, both of which are tributaries of the Tonsena. There are also a number of men working on Enestiner Fall and Bowlder creeks, tributaries of the Tiekell. Shelton Creek, a tributary of the Klutena, is also being worked, with very promising results. There are other parts of the Copper River Basin that the men are very reticent about as yet, and apparently know more than they desire to say at the present time.

There has been a great sense here of appreciation of the establishment of a Government relief station at this point, not only by those who have been assisted, but by the townspeople as well. The opinion here is that the station has relieved many, and obviated possible violence by some without means, who actually required food and shelter. Men have spoken in high praise of the thoughtfulness of the War Department in anticipating the condition liable to exist here, and in making provision for the needy. There will be required here 1,000 feet of lumber for the construction of doors, feed boxes, and mangers.

Several circumstances occurred late in the season that I will mention as showing the perilous character of the trail into the interior by way of the glacier. On November 14 the Grogg brothers, J. B. Ferguson, John Polinsky, and John Egram, with a party of nine altogether, left Twelve-Mile camp for Valdez. Two of these, a father and son, returned, and one, Mike Smith, gave out within a mile of the summit and froze to death, those accompanying him being entirely helpless and unable to render assistance. A relief party started from Valdez a day after their arrival here, but could find no trace of him and were obliged to abandon their trip, owing to a perfect hurricane blowing on the glacier. On November 15 a party of several, among whom were Walker brothers, Mr. Barrey, and Harry Fain, left Twelve-Mile camp, reaching the summit on the same day, where owing to the terrific storm they found it necessary to dig a hole in the snow with their snowshoes, where they remained four days and four nights, subsisting during this time on four quarts of beef stock and ten beef capsules. Henry Krohn, who was also of this party, reached Valdez in a bad condition, and after a week's sickness he died there. Every attention possible was given him, but blood poisoning followed, and the efforts of his attending physician and others were without avail. His death was directly attributable to exposure on the glacier and to having his feet frozen, followed by a long interval without medical treatment.

A party of four men, consisting of A. J. Wadum, Glasgow, Mont.; J. R. Marshall, Mexico, Mo.; John Eckland, Haywood, Wis., and Nels. Hegland, Appleton, Wis., arrived here over the glacier, being six days en route. They report the weather of the interior as cold, the thermometer running down to 48° below zero, with about 3 feet of snow on the ground. They started well equipped to cross the glacier, carrying an oil stove, shovels, provisions, and other utensils necessary, and only made the relief station just as their provisions were exhausted.

There has been much trouble in supplying station 24 on the summer trail with provisions, and not until January 15, 1899, was I able to get this under way. Heretofore the soft snow of

great depth has made packing almost impossible. But there are now on the way the following provisions, which will reach there about January 25, 1899, viz: 1,000 pounds bacon, 1,800 pounds flour, 4 cases granulated potatoes, 150 boxes coffee, 10 pounds hard-tack, 5 pounds pepper, 150 pounds salt, 200 pounds sugar, 400 pounds beans, 25 sacks of oats, 1,200 pounds of hay, 10 axes, 6 shovels, 4 picks, and 40 pounds of rice.

From the general feeling of those who have come over that route it is thought that the glacier trail will never again be generally used. With station 24 built and equipped, the new route will entirely supersede it. It is, furthermore, the short-cut route to the most promising placer fields thus far located.

Meteorological observations taken at Port Valdez, Alaska, from April 19, 1898.

Date.	Weather.	Remarks.
Apr. 19	Snow and rain	
20	do	
21	Clear	
22	do	
23	do	
24	Snow	High wind.
25	do	
26	Clear	
27	Snow	
28	do	Heavily.
29	do	
30	do	Snowslides.
May 1	Snow	Do.
2	Snow and rain	
3	Clear	
4	do	
5	do	
6	do	
7	do	Getting warm.
8	do	
9	do	
10	do	Snow soft and melting.
11	do	
12	do	Snow going fast.
13	do	
14	Rain	
15	do	
16	do	
17	Clear a. m., rain p. m.	
18	Clear	
19	do	Cold.
20	do	Warmer; no crust.
21	do	
22	do	
23	do	
24	do	
25	do	
26	do	
27	do	
28	Cloudy and rain	
29	Rain	
30	Clear	Very warm.
31	do	Do.
June 1	Rain	
2	do	
3	do	
4	do	
5	do	
6	Clear	
7	Rain	Very warm.
8	Cloudy	
9	Clear	
10	Clear	Snow going fast.
11	do	Very warm.
12	do	Do.
13	do	Do.
14	do	
15	do	
16	Cloudy	
17	do	
18	Clear	
19	do	
20	Cloudy	
21	do	
22	do	
23	Clear	
24	Cloudy	
25	Rain	
26	Clear	Very hot.
27	do	Everything flooded.
28	Cloudy	
29	Rain	
30	Cloudy and rain	
July 1	Rain	
2	do	
3	Clear	Warm.
4	do	Do.
5	Cloudy	
6	do	
7	Rain	Hot.
8	Clear	
9	Cloudy	
10	Rain	
11	Cloudy	
12	Clear	
13	do	
14	do	
15	do	
16	do	
17	Rain and fog	
18	do	
19	Clear	
20	Cloudy	
21	Rain and fog	
22	do	
23	do	
24	do	
25	do	
26	Cloudy; rain	
27	Rain and fog	
28	Rain	Water standing in pools all over ground.
29	Rain (hard)	
30	Rain and fog	
31	do	

Meteorological observations taken at Port Valdez, Alaska, from April 19, 1898—Continued.

Date.	Weather.	Remarks.
Aug. 1	Rain day and night	
2	do	
3	do	
4	do	
5	do	
6	do	
7	do	
8	Pleasant half day	
9	do	
10	Good weather	
11	do	
12	Rain half day	
13	Pleasant	
14	Rain	
15	Pleasant	
16	Rain day and night	
17	Rain half day	
18	Rain	
19	Pleasant	
20	Rain half day	
21	do	
22	do	Hardest of season.
23	Rain and fog	
24	do	Heavy earthquake at 10 p.m.
25	do	
26	Pleasant	
27	do	
28	do	
29	Rain	
30	Pleasant	
31	Rain	Average temperature for August, 55°.
Sept. 1	Pleasant	
2	Rain day and night	
3	do	
4	Pleasant	U. S. S. Wheeling in; visit from Captain Sebre, doctor, lieutenant, paymaster, and the governor.
5	do	
6	do	
7	Rain	
8	Pleasant	
9	do	
10	do	
11	do	
12	do	
13	Rain	
14	do	First snow on mountains, coming halfway down them.
15	Pleasant	
16	Rain	
17	Pleasant	Snow gone; trees turning yellow.
18	do	
19	Heavy frost	Snow on mountain.
20	Pleasant; cold	Joseph T. Scully died from exposure on the glacier.
21	Heavy wind	
22	Rain	
23	Pleasant	
24	do	
25	do	
26	Rain	
27	Pleasant	
28	do	
29	do	
30	do	Average temperature for September, 48°.
Oct. 1	Strong wind all day	
2	do	
3	Pleasant	
4	do	
5	do	
6	do	
7	Rain	
8	Pleasant	
9	do	
10	Heavy frost	
11	Strong wind	
12	Pleasant	
13	Heavy wind day and night	
14	do	
15	Pleasant	
16	Windy; light rain	
17	Rain; half day snow	First snowfall.
18	Pleasant	
19	Rain, light	
20	Pleasant	
21	do	
22	do	
23	do	
24	Heavy wind	
25	do	
26	Pleasant	
27	Heavy wind and cold	
28	Cold wind	28° above.
29	Pleasant	
30	do	
31		Average temperature for October, 40°.
Nov. 1	Pleasant	
2	do	
3	do	29° above.
4	do	15° above.
5	do	
6	do	
7	do	
8	do	
9	do	
10	Snowy	2 inches snow.
11	do	5 inches snow.
12	Rain all day	
13	Snow	
14	do	
15	Snow	
16	Heavy wind day and night	
17	do	
18	do	
19	do	
20	Cold and pleasant	
21	Pleasant	
22	do	
23	do	
24	Snow	
25	Rain	
26	Snow	
27	Cold wind	
28	Pleasant	
29	Light snow	2 inches.
30	Pleasant	Average temperature for November, 24°.
Dec. 1	do	
2	do	

Meteorological observations taken at Port Valdez, Alaska, from April 19, 1898—Continued.

Date.	Weather.	Remarks.	Date.	Weather.	Remarks.
Dec. 3	Pleasant		Dec. 28	Clear; high winds	
4	Snow, light		29	do	
5	Snow, heavy		30	do	
6	do		31	Pleasant	Average temperature for December, 25°.
7	Rain		Jan. 1	Pleasant	
8	Light fall of snow		2	do	
9	Pleasant		3	do	
10	do		4	do	
11	do		5	do	
12	Cloudy and mild		6	Snows	
13	do		7	Pleasant	
14	Rain		8	Clear; high winds	
15	Foggy and mild		9	High winds	
16	Light snows		10	do	A high wind, cold, and carrying immense drifts of snow.
17	do				
18	do				
19	Pleasant		11	do	
20	Light snows		12	do	
21	Heavy snows		13	do	
22	do		14	Pleasant	
23	Pleasant		15	do	
24	Heavy snows		16	do	
25	do		17	Cloudy and light snows	
26	Pleasant		18	Snowy	
27	Clear; high winds				

ALASKA.—1898.

TANANA RIVER EXPLORING EXPEDITION.

Capt. E. F. GLENN, Twenty-fifth United States Infantry.

A TRIP TO THE REGION OF THE TANANA.

By Capt. E. F. GLENN, Twenty-fifth United States Infantry.

My instructions were to begin my journey at Cook's Inlet. From thence I was to explore northward in the endeavor to discover the most direct and practicable route from tide water to one or more crossings of the Tanana River, in the direction of the Yukon, between Forty-Mile Creek and Circle City. I was to communicate, if possible, with Expedition No. 2, and to discover, if possible, passes through the Alaska Mountains south of the Tanana.

As much territory as possible was to be covered, especially that section between the Yukon, Tanana, Copper, and Sushitna rivers. I was also to collect and report all information that might be valuable to the development of the country. I was, in addition, to observe topographical features, available routes of travel, feasible routes for railroad construction, and appropriate and available sites for military posts. I was to note the general resources of the country, its timber, fuel, products, the capability of the country to sustain stock or animals of any kind, and to discover, if possible, the animal best suited for service in that country in winter and summer. Whenever practicable, maps and photographs were to accompany all reports. Small parties were to be detached from the main expedition to explore the tributaries of streams and localities not covered by the main party. I was authorized to enlist not to exceed fifty Indians, natives of Alaska, for duty with my expedition for periods of six months or less.

The personnel of the expedition consisted, in addition to myself, of First Lieut. Henry G. Learnard and 19 enlisted men, Fourteenth Infantry; Second Lieut. J. C. Castner, Fourth Infantry; First Lieut. John S. Kulp, assistant surgeon; Acting Hospital Steward Arthur Neville, and 2 privates of the Hospital Corps; George H. Howe, guide and interpreter; Luther S. Kelly, guide, and 1 geologist, all of whom were to be fully equipped and supplied to June 30, 1898. Fifty reindeer, with a proportional number of sleds and drivers, fully equipped and supplied to August 31, 1898, were to accompany the expedition to Port Wells, Prince William Sound, Alaska, where the last-named animals were to arrive about April 1. There the members of the expedition were to establish a camp and depot, and explore for routes toward Copper and Sushitna rivers. The expedition was to be ready to reembark about May 1, 1898, for Cooks Inlet, from which point we were to proceed northward. Relief stores also accompanied the expedition, with which to relieve such destitute persons as were encountered. The expedition was to complete its work by the latter part of September, when all connections therewith were to be established at Cooks Inlet, at which point arrangements were also to be made for returning the members of the expedition to headquarters. En route to Dyea I was to touch at Haines's Mission, and satisfy myself that proper steps were taken to have the reindeer and attendants for the expedition ready to embark on the return of the steamer from Dyea.

I left Vancouver Barracks, Wash., on April 6, 1898, and arrived in Seattle the following morning. I found all of our freight piled up on the wharf ready to be loaded as soon as our vessel arrived from San Francisco, which she did immediately after breakfast.

Although the climate of Seattle is exceedingly mild, not only did members of expeditions Nos. 2 and 3, but hundreds of others, appear on the streets in their Klondike suits. These suits, by the way, varied in color and material, in accordance with the tastes of the owners, and, in

the light of subsequent information, many of them were as ill adapted to use in Alaska as furs are in the tropics.

Lieut. R. M. Brookfield, U. S. A., with a detachment of the Fourteenth Infantry, arrived by the afternoon train and was immediately taken on board. At 10.25 p. m., everything being loaded and our ship's papers adjusted, the good ship *Valencia* backed away from the dock and we realized that we were off for Alaska. During the night we turned out of Puget Sound into the channel of what is known as the "inside" passage, so called to distinguish it from the open sea voyage, via Sitka, that is called the "outside" passage. The former has been described frequently, but the grandeur and picturesqueness of the scenery is beyond description and must be seen to be appreciated. On either side of the channel, which is very narrow and contracted in many places, rugged, snow-capped mountains come abruptly down to the seashore.

We arrived at Haines Mission about noon, April 12, to find Expedition No. 1 encamped there. We at once interviewed the commanding officer and also Mr. Kjellman in regard to the 100 reindeer that were intended for the use of Expeditions Nos. 2 and 3. Both of these gentlemen informed us that these deer were totally unfit for use, and that another sea voyage would result in the loss of practically all of them. It was also reported to me that at that time 36 head had died and that the condition of the entire herd was most critical. The Geological Survey party, to whom 100 of these reindeer had been assigned for exploring purposes, had abandoned the idea of proceeding to Skagway to procure other transportation. I did not attempt to make a personal examination of these animals, but assumed from the foregoing information that their condition was as represented to us. It was apparent, therefore, that both expeditions under my charge were without transportation of any kind, and our only hope of securing any was to go to Dyea, where a large train of pack mules had been sent for the purpose of transporting "relief stores" to the Klondike region and make application for a limited number of them. A storm raged so furiously during the nights of April 12 and 13 it was impossible to quit the harbor. About daylight of April 14 we raised anchor and steamed to Dyea, arriving there about 7 a. m., and proceeded to the camp of Col. T. M. Anderson, Fourteenth United States Infantry, he being in command of the district of Lynn Canal.

At this point we took on board the enlisted men that had been assigned to Expeditions Nos. 2 and 3; also Lieut. Guy V. Preston, Ninth United States Cavalry; Lieut. H. G. Learnard, Fourteenth United States Infantry, and Asst. Surg. J. S. Kulp, United States Army, all of whom had been assigned to duty with expeditions Nos. 2 and 3.

At this time the town of Dyea (plates 1 and 2) contained a population of probably 1,500 to 2,000 souls, and the floating population was not made up entirely of the best families. Besides there was a constant stream of people on the trail leading up to "Sheep Camp," and from there over the pass. Just before our arrival occurred the memorable snowslide that caused the death of nearly 100 people. Fifty-six bodies had been removed at the date of our arrival. This accident undoubtedly had a controlling effect on turning the tide of prospectors toward the city of Skagway.

Immediately after taking our freight on board we steamed down the canal to Haines Mission (plate 3), where we cast anchor about 3.30 a. m. I at once sent Lieutenants Lowe and Castner, with two scouts, to look up Mr. Kjellman and the reindeer. The lighter brought down from Dyea had been loaded with the necessary reindeer sleds, harness, etc., and also a certain lot of commissary stores intended for the command. These I had loaded on the steamship *Valencia*. I decided to leave the reindeer behind and apply for pack animals.

On the following morning, April 16, we steamed down the Lynn Canal, thence through Icy Strait and Cross Sound to the open sea, and thence to Hinchinbrook Island. We reached Orca (plates 4, 5, and 6) early on the morning of April 18. The same evening we reached Swanport, just across the inlet from Valdez (plate 18).

So eager were the passengers to get their freight ashore and the officers of the vessel to get rid of their cargo that all hands actually commenced carrying their freight from the lighters while the water was up to their waists. All freight had to be placed on top of the snow, which at this time was about 10 or 12 feet deep on the level, in order to protect it from salt water.

The captain of the *Valencia* having informed me that he intended to send Expedition No. 3 and such passengers as he had for Portage Bay to that point on board the steamer *Salmo* that afternoon, I at once caused all our freight to be transferred to that vessel.

Fourteen members of the expedition, under charge of Lieutenant Castner, were ordered to proceed at daylight the next morning to Portage Bay, where the latter was to select a suitable camping ground and unload the freight and pitch camp.

About 100 people were located in Valdez at this time. In addition there were 200 that had been fellow passengers with us on board the *Valencia*. In addition to the latter were those engaged in trying to transport their goods over the Valdez Glacier. Between 250 and 300 had succeeded in crossing the glacier, which is 25 miles in length, and were in camp on or near Lake Abercrombie on the other side. The remaining portion of the prospectors were distributed from the summit of the glacier down to the city of Valdez. Most of those going over the glacier were men. There was a number of women as well, and most of them had doffed their usual costumes and were to be seen in men's apparel working alongside their partners, helping to drag their sleds and generally doing their full share of the work.

On the day of our arrival at Valdez, or within eight or ten hours after the first lighter went ashore, I discovered that one of our fellow-passengers had opened a saloon, exposing for sale intoxicants of all sorts. His was not, however, the only saloon in town. Intoxicating liquors were sold openly at Dyea, contrary to law. During my sojourn in Alaska I have frequently seen native Indians under the influence of strong drink and was impressed with the difference in its effect upon them from that observed upon the American Indians in the United States proper. The Alaska Indians with whom I came in contact do not become violent and warlike when intoxicated. On the contrary, they tend rather to stupidity and good nature. (Plates 9–14.)

We sailed for Orca April 21, arriving at midnight. There is a cannery here, with a capacity of 50,000 cases per annum. It employs from 125 to 150 men, about 60 of whom are Chinamen, who perform all the work in the cannery, making, packing, labeling the cans, and boxing them for shipment. The remainder of the force was comprised of fishermen and boatmen. The greater portion of the fish are caught at the mouth of the Copper River.

At Orca the steamer *Salmo* was chartered to explore Port Wells and the adjacent inlets. We arrived at our camp April 23, which had been previously located by Lieutenant Castner on the south side of Portage Bay. The bay is inclosed by immense glaciers and snow-capped mountains. It is about 10 miles long from Point Pigot to its head. It has a sufficient depth of water for all vessels, and has two or three well-protected harbors, which afford good anchorage. The snow was 7 or 8 feet deep on the lowlands. At the head of this bay begins the regular winter trail, which is utilized by people of the Sunrise mining district. The glacier separating this bay from Turnagain Arm is about 5 miles across. It is not very high and is a perfectly safe and feasible route for traveling during the winter months. But, like all other glaciers, during the summer months when the snow has melted crevasses appear and render travel over them both difficult and dangerous. The entire distance from Portage Bay to tidewater on Turnagain Arm is about 12 miles. (Plates 19–24.)

We sailed the next day for the mouth of Port Wells. After passing Esther Island, which lies in Port Wells Inlet near its mouth, we soon reached an arm of the inlet. At the head of this arm is Barry Glacier (plate 15), one of the most formidable as well as the most interesting of any I have seen. Coming out of the arm we saw icebergs that were from ten to twenty times as large as our boat.

On the following morning we came to the head of Port Wells Inlet. Directly in front of us, glistening in the sun, were two large glaciers, the pair being separated by a short ridge or hogback. In front of the one on our right the sea ice extended for over 3 miles, while in front of the other the sea ice extended at least twice that distance. The ice was covered with snow several feet in depth. Each of these glaciers is what is termed a "live" or "working" glacier. The front of each was an almost perpendicular mass of ice, from which immense pieces were constantly breaking off and falling into the sea with a great roaring noise. At the upper extremity of the hogback these glaciers apparently join and cross each other, and extend to the summit of the mountains,

distant at least 40 or 50 miles (plates 16 and 17). The maps show these mountains to be 10,000 feet high. There are several peaks at this point of about the same altitude.

All of our party, excepting myself and the boat crew, made a trip up on the right-hand glacier for a distance of about 12 miles. This was one of the best of locations in which to study the actual formation of glaciers. In addition to the "Twins," there were in full view on the west shore between each pair of peaks six well-defined glaciers apparently under process of formation. The snow from these peaks, in the spring of the year, slides down into the ravines, or low ground between them, and carries with it everything in its path, including immense bowlders, trees, etc., all of which lodge in the ravines below, where a great part of it becomes congealed, not only from its own weight (I am informed that snow will congeal from its own weight at a depth of 40 feet), but from the action of the weather as well.

As often as two or three times every hour during the day we saw and heard these snow slides, the noise of which, alternating with the noise caused by the falling of the immense ice floes from Barry Glacier, could be heard like the rumbling of distant thunder, and which seemed to shake the mountains on either side of us. We must have been at least 15 miles from Barry Glacier, and yet we could distinctly hear the icebergs falling from it into the sea. The party that climbed the Twin Glacier made use of the Canadian showshoes with which we were equipped for service in this expedition, and each one of them joined in condemning the shoes as a means of transportation over the snows in Alaska. They are too short, too broad, and too flat. All of the party were terribly sunburned.

On April 27 Lieutenant Learnard's detatchment was directed to cross the Portage Glacier and ascend Twenty-Mile River, to find, if practicable, a route from Portage Bay to the Knik Arm.

On the morning of April 29 I proceeded to steam to Valdez, reaching there in the afternoon of the same day. Here we found all of Expedition No. 2, excepting Lieutenants Lowe and Brookfield. There was a fall of at least a foot of snow during the day. On the following morning I measured the depth of the snow fall during the night and found it to be 14 inches. On the surface of the salt water of the inlet there laid from 18 to 20 inches of unmelted snow. It was still falling and the air was so full of it that the captain of the Salmo was afraid to venture out of the harbor at Swanport, and this notwithstanding the fact that it was unaccompanied by wind. While here I learned that Expedition No. 1 had been abandoned. It was here also that I first saw a horse using a snowshoe, made of hay and gunny sacks. The poor beast not only handled them very well, but seemed to appreciate the fact that they were put on for his benefit. The snow was so soft that he broke through it every few steps, severely wrenching himself, in spite the precaution taken.

We sailed May 1 for Orca, and finally reached our destination about the middle of the afternoon. We cast anchor for the night at Fox Island, on which Mr. Story, the agent of the Alaska Packing Association, and some others, are engaged in raising foxes. I learned that they pay the United States for the use of this island an annual rental of about $100 and that their plant, including the foxes placed there, had cost them $12,000, with practically no return up to this the third season. At their last inventory they had on hand about 300 head of foxes. The theoretical increase of these animals is seven per female per annum, although they are amply satisfied if they succeed in raising five.

Although these animals run wild on the island, they can be caught readily and without injury. To do this, they make use of what is known as a box trap, from which they select the males and release the females. The pelts of these foxes are valued at about $12 to $15 each. Of course the pelt of the silver-gray fox is much more valuable than that of the blue fox, but all attempts at raising them have been unsuccessful, as they multiply little, if at all, under confinement. It is stated also that they destroy their own young. This company procured a few of them when first incorporated, but subsequently killed all that they had placed on the island. The blue fox are permitted to run wild on the island, but are fed regularly on fish. Procuring the fish is the principal expense connected with their propagation.

On the morning of May 3 we sailed for Unaquig Inlet, which is to the eastward of Port

Wells Inlet. The rain and fog prevented us from seeing very far into the mountains, but far enough for us to determine that no outlet exists at or near the head of this bay.

In the evening, about 10 p. m., we pulled out of the mouth of this stream and into the bay, where we lay at anchor to await the turn of the tide, which was then running in rapidly. We got under way again at 2.30 in the morning. We arrived in camp early in the afternoon to find that the snow on the glacier and in the flat back of the camp was melting rapidly. At this time I received reports from Lieutenant Learnard, who had crossed the glacier, that were far from encouraging. Having lost some of his rations, he would have been in bad shape had he not met a prospector, who very willingly turned over to him all of his rations, with the understanding that the same amount be delivered to him in return at Sunrise City. For some days Lieutenant Learnard had been suffering from snow-blindness. He was affected so seriously that he had to be led back to camp by one of the men.

On the afternoon of May 6 I was much surprised to find the steamship *Pacific* steaming up the bay toward my camp, and I confess to a feeling of disappointment, since I knew it indicated that there was no hope of finding a passage through the mountains from any point on Port Wells Inlet.

On May 7 Lieutenant Learnard, accompanied by the geologist and five enlisted men, reported to the permanent camp that they had crossed the glacier without serious trouble, carrying the sleeping bags and clothing of the men upon a sled. Lieutenant Learnard stated that it was impossible to ascend the Twenty-Mile River at this time, on account of the ice gorge near its mouth.

On the morning of May 19 the spirits of everyone rose with the sun, which we had not seen for two weeks. We had seventeen hours of sunshine without a cloud in the sky. Mr. Kelly took advantage of it to signal across the bay to us by means of an improvised heliograph. He used a small pocket looking-glass about 1½ inches in diameter. Although he was 5 miles from us and on the level ground we had no trouble in seeing the flashes or understanding that he wished to be sent for. Upon his return he reported having discovered at least 100 acres of excellent pine timber that stood very thick, and which would be very useful for the construction of buildings should this ever become the starting point of a trail into the interior.

On May 20 a party, including myself, made an examination of a terminal moraine at the head of the bay. This proved to be one of the most interesting discoveries we made in Alaska. It consists of a detached or isolated hill not far from tide water and contains about 2 acres of surface on its top. It is surrounded at a distance of from 30 to 50 yards from its base with a pile of rocks or bowlders which evidently mark its original size. From this circle this moraine has gradually receded for a number of years, due to the action of the elements. Within the circle of bowlders other bowlders had been deposited, but in no regular order. The top and sides of this moraine are covered with a collection of dirt and stones to a depth of several feet. In the northeast corner there is a circular opening that shows a clear, blue ice. At the bottom of this we discovered two caves running for an unknown distance into the ice. In front of this opening snow has drifted to a depth of 30 to 50 feet, and it was with considerable difficulty that we managed to reach the mouth.

On July 17 I loaded all necessary rations and men on board the steamship *Perry* and sailed for Sunrise City, reaching there on the following morning. Here I secured 25 head of horses and mules. On July 25 I camped at Beaver Creek. En route we passed between Lucile and Finger lakes. Moose Creek was reached July 26. On the day following we followed up the Matanuska River for about 3 miles, when we went into camp. On July 31 I divided our supplies between my own detachment and that under Sergeant Mathys. My detachment was to accompany me to the interior, by the head of the Matanuska, while the other was to go up the Chicaloon and thence over the divide to Talkeetno. We crossed the Chicaloon in the course of the forenoon without difficulty. The stream was full of rainbow trout and grayling. The panning of the gravel in this creek indicated a few colors to each pan, but I do not believe the indications warrant serious prospecting. The entire creek had been staked off into claims by a party of miners located at the mouth of King Creek. From this stream on until we arrived at

Bubb River we were constantly in sight of herds of mountain sheep running along the sides of steep mountains to our right and left. Their trails usually ran along the side of perpendicular rocky cliffs, and at all times near the summit. We found we had climbed 1,350 feet from the valley of the creek and that our total elevation at this point was 2,450 feet. The view toward Knik, from the top of the divide was one of the most superb we had seen. The accompanying view gives but a poor conception of it. (44, 45, and 46). Nestling in the mountains to our right, and across the Matanuska River, could be seen a number of large glaciers. On the sides of the mountains we also saw immense masses of red flowers, covering large areas. In the mountains to the rear were three or four beautiful lakes, and Schoonoven Creek could be seen in the distance. We passed a number of places where the red-topped grass grew as high as our waists. This grass at the season of the year I passed through this section of the country was very nutritious and ready to be cut. The next day we turned north out of Matanuska Valley and up one of its tributaries, called Hicks Creek. At the junction of these valleys we were forced to climb another mountain, 1,300 feet high, the other side of which terminated in a very deep gulch through which flowed a small stream. In the bed of this stream we camped for the night. (48, 49.)

On August 7 we followed down Bubb River to a tributary of the same coming in from our left, and which the Indians called the Taikano. We found Bubb River and its tributaries full of trout and grayling, but the latter were very wary of rising to a fly. They took caterpillars or similar baits with avidity. On the next day I decided to leave Lieutenant Castner's trail and turn directly toward the north, hoping thereby to strike the divide between the Sushitna and Copper rivers. With the exception of the first mile or two the trail passed through a very good country. About 4 miles from camp we came to quite a large valley, in which grew some of the best grass for hay seen on this trip. This valley must be at least 2 miles square. It is entirely covered with grass, which at this time was standing nearly up to our waists. For the first time on the trip the entire Mount Wrangell group was visible. Mount Wrangell is the center peak of this collection and is very much higher than the others. We entered what we called the "burned district," which seemed to extend as far as the country is visible toward the Copper River, and to the northward almost to the Alaskan range. On August 12 we came in sight of Lake Louise, at the head of the Sushitna River. This is by far the most beautiful lake seen on our trip. Its waters are evidently deep enough to float vessels drawing from 6 to 8 feet, or those even of greater draft. It is dotted with beautiful islands and the country surrounding it presented the same general appearance as the lakes I have seen in the State of Minnesota. Shortly after leaving camp the next day we struck what we assumed to be Lieutenant Castner's trail, which we followed for a short distance. Finding that it led directly to the north we again resumed our course to the northeast. Leaving it to our left we supposed we would not see it again. We subsequently crossed it a couple of times, but again left it and continued in our general direction. We traveled August 14 through a country of the same general nature as of the day previous for 13 miles. About 3 p. m. we came in sight of two very large lakes to the eastward, our right, and evidently about 10 miles from our trail. This we took to be what the Indians called "Lake Plaveznie." The next day we traveled down the river about a mile, when we again resumed our original direction and traversed a marshy and mossy district for a distance of 9 miles.

On August 19 we calculated that we had traveled 222 miles from Knik Station. We had now arrived at a point where it was necessary to make some preliminary examination of the country in front of us before deciding upon our future course. Our guide stated that we should not, under any conditions, advance to exceed ten days more since the chances were very much in favor of the Matanuska River being frozen on our return. Should this be true we stood a chance of losing all our stock. The guides climbed some of the adjacent foothills to ascertain if there were any prospect of finding a pass through the mountains in front of us. The Alaskan range to the eastward, or toward the head of the Copper River, presented a most forbidding aspect. But to the northward there appeared some evidence of a chance to get through to the Tanana in our limited time. Mr. Hicks, the guide, returned about 6 p.m., reporting that he could discover no opening directly toward the Tanana, but he was positive that he saw a pass in the mountains that would

bring us out toward the head of the Sushitna River. He plainly discovered, he said, a pass through the range to the eastward, about 40 to 50 miles distant in a direct line. The country from our present location to the pass was an open one, with no obstacles except the Chestochena River. Our orders directed that all of the expeditions communicate with each other if practicable, so I decided to permit Mr. Kelly to go across for the purpose of examining this pass, and at the same time agreed to furnish men and stock to accompany him. The only real gain from this would be the possibility of establishing communication with Expedition No. 2. But this was regarded by all of us as being rather remote. In view of this fact, the lateness of the season, the distance from our present location to that point, and the possibility of his failing to join my party on its return, Mr. Kelly did not think it wise to go across, which conclusion all concurred in.

We found by observation that Mount Sanford, of the Wrangell group, lies south 60° east of us. We calculated that the Copper River was not to exceed 30 miles from us. About 6 or 7 miles to our right we could readily trace a stream flowing through two rather large lakes, which we took to be Chestochena River.

Mr. Kelly reported that he had found a plainly marked trail to our left that ran directly north toward the mountains. This I decided to take the following morning in the hope that it would lead us to the head of the Johnson River, down which we had been informed was an Indian trail to the Tanana River. The footprints of the white people which we had discovered the day before were evidently this trail. On the Chestochena River we found considerable evidence that it had been passed up by the white men this season. Although the grass in the willows was abundant and nutritious, our stock succeeded in breaking into the packs and destroying a 50-pound sack of flour. This was a serious loss.

On August 20, having sent the Indian and one guide forward to pick up the trail referred to, we followed with the command about two hours afterward. Traveling about 5 miles farther, we struck this trail and followed it for about 7 miles, when we went into camp. A small stream, evidently a tributary of the Chestochena, flowed directly by us, and it was full of grayling. Neither this stream nor those we had crossed for the past few days carried any gold. We were now satisfied that the trail we were on was not simply a game trail, as it gave evidence of having been in use by the Indians for a long time. Our general direction was still almost directly north.

Just before entering the pass in the mountains our trail led us through a beautiful network of lakes. The waters from some of them apparently had no outlet, while that of others seemed to flow in opposite directions—i. e., toward the Copper and Tanana, or Sushnita, rivers. (53–4–5–6.) About 12 miles from camp we ran into a trail we assumed to be Lieutenant Castner's. In any event we now felt that we had struck some pass that would lead us to the Tanana River. We passed through an abundance of huckleberries, which were growing more luxuriant and apparently larger than those found near the seacoast. After making the longest march of the trip, 17 miles, we went into camp on a spot where the grass was so luxuriant that the stock did not move from one small spot, of less than 1 acre, during the night, and gave evidence the following morning of being thoroughly satisfied. The next day we felt that we were over the divide and that the chances were excellent for reaching the Tanana. The first sign of Indian life seen by us since the command left Knik Inlet was on August 25. Just opposite the Indian camp, which was 270 miles from Knik Inlet, is a very considerable tributary which flows into Delta River, down which we were traveling. We named it Wilder Creek. A practicable trail for pack animals, a railroad, or wagon road can easily be made over the route we traveled. I am satisfied that to the right of the trail followed a lower pass could have been found that should have brought us out near the mouth of Phelan Creek. On August 24 we reached Lieutenant Castner and his command, and learned that he had nearly completed a raft on which he intended to float down the Delta to the Tanana, then down to the mouth of the latter.

On August 25, after traveling about 10 miles, we crossed a small creek, and then climbed a hill to a small lake. This hill runs abruptly down to the river, whose bed at this point was about a mile in width, to a valley on the other side of about the same width. The indications pointed to our being near the mouth of the Delta and therefore near the Tanana. We panned some on the

following day, but with indifferent results. A nice-looking piece of float quartz was found in one of the streams we passed during the day. My sleep during the night previous was interrupted several times on account of the cold. This was a sure indication that our time for turning back was near at hand. In fact, this was the day set as being the last for advance, but I decided to go on at least two days more, in order, if possible, to reach the Tanana and assist Lieutenant Castner and party across the stream.

On August 27 I decided that Lieutenant Castner should take the two smallest mules with such rations as could be spared and proceed to Circle City, while I with the rest of the command should return to Cook Inlet. In taking an account of our stock and provisions I found we had very much less than half the amount of flour necessary for our subsistence, while we were practically out of bacon. It was necessary for us to procure fresh meat to avoid suffering on our journey. On August 30, as soon as the division of rations could be effected, Lieutenant Castner had his rations packed on the two mules assigned him, and photographs were taken of the outfits separately. We parted in the morning about 9 o'clock. After his command had started on their trip I proceeded to return over my back trail to the point from which I had originally started.

Notwithstanding the reduced condition of the stock, they seemed to realize that they were traveling homeward and pushed along at a much faster rate than when they were advancing. The following day we made 16 miles. The march was much dreaded by all hands, because we had to cross the glacial stream that gave us so much trouble on the advance. We found that both streams had changed their channel in the short time we were away, but that they had also fallen so much that we easily forded them. It was now the month of September, and the nights were freezing cold. On account of the lateness of the season the grass was badly frozen and the stock did not fill up on it.

On September 12 we arrived at Bubb River, where was located a cache. We gave the animals some of the flour that we found deposited there, and they showed every evidence of being strengthened by it. As it was necessary to make some arrangements to secure food for the animals, if they were to be returned to Knik alive, I ordered two of my men to proceed to Melishe's cabin, 141 miles distant, and hurry forage up to meet the command. They made the distance in the remarkable time of four days and a fraction. Shortly after noon September 14 we crossed the last stream that emptied into the Copper River. From this time on the waters flowed toward Cook Inlet by the Matanuska River.

We climbed the east bank of Caribou Creek September 17, leaving Glacier Point at our left. After traveling a distance of 12 miles we came to Hicks Creek and camped near its mouth. There is no question that a pack, or wagon trail, or a railroad can be made to reach the Bubb River by the trail followed on our return. Improvement in the grades could be found, no doubt, particularly at the mouth of Hicks Creek. We arrived at Schoonhovens Creek on September 19. On September 21 we reached Marshall Creek, where we found Mr. Bagg. Subsequently we pushed on to King Creek, and crossed down to Young Creek, where we went into camp for the night. On the next day we traveled as far as the "Lakes." This route can be made perfectly feasible for a wagon road by corduroying across the marshy places.

In the afternoon of September 27 the steamer *Perry* arrived. I learned from the mail received that Lieutenant Learnard had arrived at Tyoonok. The total distance traveled into and returning to the interior was 672 miles, of which 347 miles were made in the advance. The distance named included all of the windings of the trail. The following day I took the remainder of the command to Tyoonok. On October 10 I reached Homer. The last-named place consists of a sand spit, which runs into the sea for a mile or two, thus forming a very good and well-protected harbor. (87 and 88.) Located at this point were a number of prospectors. There seemed to be neither wood nor water at the spit, but I found that there was plenty of coal at Coal Bay, near by. The coal banks are located about 10 or 12 miles from Homer. The coal lies in seams, and is from 18 inches to several feet in thickness. A number of the coal beds appeared at different elevations to be from 10 feet to 20 feet apart and were located in a bluff about 200 feet high at that point. The lower seam contains better coal than the upper or

exposed strata. The best coal is secured when the tide is out. The coal is bright and clean to handle, and is readily broken off with picks in large pieces. When dry, it breaks into cubical fragments, and resembles anthracite very much in appearance, although it is not its equal in weight. The officers of the steamship *Perry* informed me that the coal had been used by vessels for the past three years. They also stated that it burns to an ash, and that it was easy to mine.

At Saldovia I met Mr. Paul Buckley and some prospectors. Mr. Buckley had prospected a mineral-stained ledge at the entrance of the bay that promised good results. The ledge had been in full view of every passing vessel for the past twenty years, but it appears that no one had previously investigated it.

At Kenai, which we reached October 15, I found a Russian bannya. It consisted of a small log cabin, about 10 by 12, divided into two compartments, one of which was very narrow and was used as a dressing room. The other, 8 by 10, contained a brick furnace, over which was a large iron pot filled with water. Alongside of this, and heated by a fire built in the furnace, was a pile of brick in an open oven. The method of taking a bath consists of providing oneself with a tub of reasonably hot water. The water from the pot is then thrown on the heated bricks in the open oven until the steam produced raises the temperature to the desired point. A novice does not require very much steam. After a thorough perspiration is started, a regular bath is taken in the tub. Then the bather returns to the dressing room, cools off thoroughly, dresses, and goes as quickly as possible to some warm room. The Indian bannya consists of only one small room, scarcely large enough to sit up in. Here the steam is produced by throwing water on a pile of rocks which has previously been heated and piled in one corner. The bath or real cleansing portion of the operation is entirely omitted. While still perspiring profusely, the bather crawls out of the small opening into a cold room, where he sits for some time before dressing. Some are foolish enough, in the winter season, to walk out from this hot bath and while in a profuse perspiration roll over and over for some time in a snowbank.

Kenai is a very old Russian settlement. It is the site of an abandoned military post. There was located at the time I was there a trading store of the Alaska Commercial Company and two canneries belonging to the Alaska Packing Company and the Pacific Steam Whaling Company. There are both Indian and Russian settlements located here. These settlements are separated from each other by only a short distance, and the population of each is something over one hundred. (91.)

My uniform attracted the attention of the old chief, who had been appointed such by the commanding officer of the American troops stationed there many years ago, and who had proved himself to be worthy of the trust reposed in him. He was nearly 90 years of age, and had sometime previous transferred his scepter to his son. The latter did not remain around the station very much, on account of his inability to agree with the Russian priests, who have appointed another Indian as chief in his stead.

I found the old chief very anxious to have his people learn the American language and ways. He was especially interested in the establishment of schools in Cook Inlet. His chief interest in this centered in Kenai, his native place. He particularly emphasized the fact that in these schools the younger Indians should be taught to speak the English language. After I had promised to use my best efforts to see that schools were established, as he requested, he seemed very much pleased and, with the most stately manner imaginable, looked reverently heavenward, crossed himself twice, turned to me again and stated he was most profoundly grateful that I had seen fit to call upon him. He remained in the most courteous and dignified attitude until he was assured his speech had been interpreted to me and that I understood it. Then he again turned his eyes heavenward, made another profound bow, and retired to his couch. Although he crossed himself, as stated, he was anxious I should be informed that he belonged to no particular religious denomination and that he had reached an age when he must soon pass away.

On October 17 we departed for Tyoonok, reaching there the same evening. We reached Vancouver Barracks, Wash., November 10, the starting point of our expedition seven months previously.

TOPOGRAPHICAL FEATURES.

The first mountains observed in going to Alaska is the Coast Range, that follows along the curve of the North Pacific coast line up to the head of Lynn Canal, where, according to Mr. C. W. Hayes, of the United States Geological Survey, it passes behind the St. Elias Range. The latter extends in the general form of a crescent from Vancouver Island, below which it joins the Coast Range of Oregon and Washington, through the Alexander Archipelago, thence around Cross and Prince William sounds. The western horn of the crescent terminates in the Kenai Peninsula and Kadiak Island. In the central portion of this crescent is the Mount St. Elias group, that reaches an elevation of nearly 20,000 feet.

These two ranges form an almost insurmountable barrier to the prospectors who desire to seek their fortunes in the interior of Alaska. The average width, or thickness, of each range is about 40 to 100 miles. Each range is made up of snow-capped peaks, and imposing glaciers lie between each of them. The glaciers form equally as serious obstacles to travel as the peaks themselves.

There are but few large water courses breaking through the St. Elias Range from the interior. The principal ones are the Sushitna, Matanuska, and Copper rivers. The Sushitna rises in the Alaskan range, just south of the Tanana River, and flows in a general southerly direction, emptying into Cook Inlet at its head. It is navigable during the open season, for something over 100 miles from its mouth, for properly constructed boats. It would probably be more accurate to state that instead of breaking through the St. Elias Range, with the Cook Inlet, it separates this range from the Coast Range, lying on its north and west.

The Matanuska River, just inside the St. Elias Range, is not navigable and flows in a general westerly direction parallel to it, cutting off a spur of the range that lies between it and the Sushitna River on the west. The Copper River also rises in the Coast Range of mountains, flows through the St. Elias Range, and empties into the Pacific Ocean east of Prince William Sound. It is not navigable, on account of the presence of certain obstacles, such as glaciers and rapids, a short distance above its mouth.

The Matanuska and Sushitna lie directly in the territory I was directed to explore. The former is about 100 miles in length, has a number of tributaries, principally on the west and north side, and passes through a valley with an average width of not to exceed 20 miles. No one of these tributaries carries enough water to be properly termed a river. The valley lies principally on the same side as the tributaries. It is generally upland, rising gradually to the head of the river. The Sushitna River is about 200 miles long and flows through a very wide and comparatively level or rolling valley. Near the mouth of the river this valley is quite low and flat, with considerable marshy ground. In this portion the vegetation consists of small shrub or brush, but farther up the valley and toward the mountains on either side are found some very good-sized trees. Some of these trees will make very good lumber. The interior of the country, after passing through the mountain ranges, consists of low, rolling hills until the Alaska Range of mountains is reached. This portion of Alaska is of the same general appearance as certain sections of our Northwestern States, such as Minnesota, the Dakotas, and Montana. The vegetation is quite different, since the greater part of this section is covered with several varieties of moss that offer a very serious obstacle to travel until a trail has been broken over it. In addition to this moss, several varieties of good grass can be found. Also trees, but the latter are not so large as those found near the seacoast and in the valleys of the streams mentioned hereinabove. In that portion of this section heretofore described as the "burned district" the grass appeared to be more abundant and of somewhat better quality than where the moss had not been burned off. This was noticeably the case in the valley of the Matanuska River.

The Alaskan Range of mountains lies just south of the Tanana River and, considered broadly, is probably a part of the Coast Range which, like the St. Elias Range, has the general form of a crescent. Its western fork runs down to the west of Cook Inlet and terminates in the Alaskan Peninsula and Aleutian Archipelago. In general features it is quite similar to the

St. Elias Range, except there exists many more low, broad passes or openings through it. Many of these are known to be sufficiently low and broad as to offer no serious obstacle to travel through them. The valley of the Tanana River at the point we saw it—the mouth of the Delta River—is from 20 to 30 miles wide. It was covered with a dense growth of timber of medium size, principally spruce, throughout which was a dense growth of moss. Beyond it on the northern side for a distance of 40 to 70 miles, estimated, is a low range of foot hills that we assumed to be the Tanana or Ketchumstock Range.

The range of mountains between the Matanuska and Sushitna rivers presents the same general appearance as the range along the coast until some distance above the head of the Little Sushitna River, when the peaks gradually become lower, terminating in a plateau near the Chaniltno River.

The Kenai Peninsula, which lies between Cook Inlet and Prince William Sound, is quite mountainous on the eastern and southern portion, but on the northwestern side there is a comparatively low gravelly country which slopes back gradually to the mountains for a distance of about 40 miles. The country on the north coast of Cook Inlet is, in general, very similar to that just described. The distance from the coast to the mountains varies from a few miles to 70 or 80.

AVAILABLE ROUTES OF TRAVEL.

The only available routes by which one could reach the gold fields of Alaska, or that region of country north of the Tanana River, including the Yukon and its tributaries on both sides from Rampart City to Lake Bennett, and popularly described as the "Klondyke" region, up to the beginning of the year 1898, were via the head of Lynn Canal, either through the Chilkoot or Chilkat passes, thence down the Yukon River, by boats or dog sleds, depending upon the season of the year, and via St. Michael, thence up the Yukon by steamer. The objection to the former consists principally in the fact that as soon as one reaches the summit of the mountains back of Dyea or Skagway he passes out of American into English or Canadian territory, through which he travels during the remainder of his journey to Eagle City, just below or north of Dawson City. In passing into foreign territory one is forced to pay duty on everything in his outfit which, to the average prospector, is a serious burden.

The only serious objection to the route via St. Michael was and is that the Yukon River freezes over for nearly nine months of the year, thereby cutting short the time for prospecting during the first year.

To avoid the foregoing objections it was necessary to explore the intervening points on the seacoast of Alaska that presented the most favorable prospects for an opening into the interior of that Territory. Such points must not only furnish a practicable outlet, but this outlet should be from a harbor open during every month of the year, if possible. By previous explorations it had been determined that the Copper River could not be ascended from its mouth; so that if the valley of this stream should prove to be of value as a trail to the interior, it must be reached via Prince William Sound, about 100 miles above its mouth. Valdez Inlet was considered as the most favorable point from which to start an exploration. It was also known that Cook Inlet, and all points of the coast north of it, were frozen over during certain months of the year; but it was believed that from the head of that inlet a trail could be found to the Yukon. The first duty in connection with this work was to find, if possible, a trail from Prince William Sound to the head of that inlet, and the next to find an outlet from that point.

From the best information obtainable, a route existed from some point on Port Wells Inlet of Prince William Sound; still another from Resurrection Bay on the east coast of the Kenai Peninsula. An investigation of the former showed that our information was erroneous. We succeeded, however, in sending a small party over what is reported by Mr. Kelly as being a practicable trail from Portage Bay to the head of Knik Arm, passing Turnagain Arm on the north side. From this report the details concerning this trail can be gathered. It is only necessary to mention here that this route runs from Portage Bay, on the coast, up Cabin Creek, over the divide, to the head of Twenty Mile River; thence up to the west fork across to Winner

Creek; down this to and across California Creek; thence up Crow Creek, a tributary of California Creek, to Raven Creek; thence down it and the Yukla River to Knik Arm.

The serious obstacles to be overcome in going over this trail are to be found in crossing the divides. The first one, between Cabin Creek and Twenty Mile River, is less than 2,000 feet high, with no reported danger from snow slides. There is no glacier to cross, but some difficulty may be experienced in reaching the top of it with a satisfactory grade. The distance from tide water to the summit is about 6 miles.

From the foot of the divide on the north, Mr. Kelly says:

> From Lake Glenn the proper course is westerly across the main stream, the Twenty Mile River, thence up the right bank of the west branch to the pass, over a comparatively level ground which required the cutting of some brush. By means of a winding trail the ascent and descent of the pass is easy, as timber extends nearly to the top. While the snow was very deep on the summit, we found no glaciers nearer than 2 miles.

As to the next divide, he says:

> I * * * proceeded to the summit of Crow Creek, where I found a favorable pass with fairly good traveling and a gradual ascent. The descent on the other side is not difficult to Raven Creek, which runs due north for 7 miles to Yukla River. A trail can easily be worked down the right bank of this gulch.

There is a glacier at the head of Raven Creek about 2 miles long, which was avoided by Mr. Kelly, who left it to his right. Although this is a comparatively short glacier, it is impracticable to construct a trail over it or any other glacier. This can be avoided, as reported, by passing over the high ground to the south of it. An investigation of the route from Resurrection Bay to Sunrise City showed that a trail could be constructed to the last-named point. This would be of local value only, since the difficulties in the way of crossing the Turnagain Arm are practically insurmountable, were it not for the fact that instead of going to Sunrise City a trail has been found down a creek that puts into the head of Turnagain Arm. From this point the trail would pass up Twenty Mile River to the west fork, from which point it would coincide with that previously described from Portage Bay.

The Kelly trail should, immediately after passing out of the mountains, leave the Yukla River, turn up the Knik Arm toward and across the Knik River; thence up the valley of the Matanuska River on the east bank for about 20 miles. Here this stream should be crossed by means of a bridge. At this point it strikes the trail followed by my command in returning from the Tanana River. No obstacles that are insurmountable, or even extremely difficult, will be encountered from this point to the Tanana River. From the head of the Matanuska River this trail crosses the Tazlena River at its head; proceeds thence to Bubb River over comparatively easy grades in a direction somewhat east of north; proceeding thence in the same general direction to the Alaskan Range of mountains. As previously stated, the trail from Bubb River passes along the divide between the Copper and Sushitna rivers. This was conclusively shown by the fact that the streams we crossed were very small and flowed from lakes whose outlet streams ran in opposite directions.

After passing through this district my own trail turned somewhat more toward the north, but an equally good trail exists to the Slahna River, on the east. Thence it passes through the Alaskan Range, and strikes the Tanana River much farther to the eastward and nearer its head waters. From a careful inspection of the intervening country to the east there exists not the slightest doubt that Lake Menasta Pass can be reached readily. The only difficulty will be in crossing the Chestochena River, a tributary of the Copper. This should not be difficult, as it was crossed by Expedition No. 2 near its mouth.

In returning to my own trail of last summer and fall it is only necessary to add that it leads through a very good pass in the Alaskan Range, and showed evident signs of having been used by the natives from the Copper, Sushitna, and Tanana rivers for an indefinite period. This was apparent from the number of trails we found leading into it. Our time for exploration was so limited that it was impossible to determine whether or not the trail actually followed by the command was the best that could be found down the Delta River. From the hurried observations made by us we were satisfied that a route with a lower grade—one, in fact, that would avoid all the heavier grades—could be found down the river a few miles, to the east of the trail we

followed. In going through we were following the Indian trail without regard to the surrounding country. Aside from the few marshy places that can be readily made passable with material close at hand, aside from the necessity of bridging certain streams crossed, especially the tributaries of the Matanuska that it is advisable to bridge, and aside from the labor required to cut out the number of trees necessary to permit of passage through with wagons or pack animals, no very great amount of labor will be necessary to construct a perfectly practicable trail for pack animals or wagons from Cook Inlet to the place where my expedition turned back.

After leaving the St. Elias Range of mountains, and during practically all of the time that intervened up to our return to the same point, the rainfall was almost constant. It is fair to assume that the country passed over was seen under the worst possible condition. It is quite certain that all marshy places would be as troublesome as at any season of the year. Only two places had to be repaired before passing over them. The amount of corduroy used for the two did not exceed 30 to 40 feet. This is fairly good evidence of the facility with which a pack train can be utilized in that section of Alaska. The party that was sent up the Sushitna River did not use pack animals, but relied upon boats to carry their goods up the river as far as the forks, or to the Talkeetna River. As stated hereinbefore, the intention was to furnish this detachment with pack animals, via the heads of the Chicaloon and the Talkeetna rivers. In this we failed, but so certain am I that our information, obtained from the Indians, to the effect that a practicable trail for pack animals can be found over this route and from there up the trail followed by Sergeant Yanert is right, I ordered him to make a snowshoe trip over it during this winter.

The Sushitna River is filled with islands and innumerable sand bars, as shown by the inclosed map prepared by Sergeant Yanert. In fact, the word "sushitna" means sand. In English the river would be known as the "River of Sand." Several attempts were made during the past summer to navigate this river with steam launches, but with indifferent success, above the Alaska Commercial Company's store, about 25 miles from its mouth. The small steam launch of the Boston Company, above referred to, managed upon one occasion to go about 5 miles above the station, but was unfortunate enough to break all but two blades of her propellers and was forced to return. The small stern-wheel boat went up quite a distance farther without serious accident of any kind, but her wheel was ridiculously short and her power so inadequate that her failure would imply nothing whatever as to the navigability of the stream. I made diligent inquiry of all persons who were at all familiar with this stream from actual experience, and all agree that a properly constructed stern-wheel boat with sufficient power to successfully stem the current or to check herself quickly when descending the river could navigate it. Not only is the river filled with sand bars and islands, but the channel changes with great frequency, so that the channel followed in ascending will not usually coincide with that used in descending.

From a report upon this subject by Lieut. H. G. Learnard, who had command of the detachment sent up that stream, I learned that he had arrived at the conclusion that this stream was navigable for about 120 miles. The type of boat recommended is a sternwheeler, with a speed of about 15 knots. The following extracts from letters addressed to me by Messrs. W. J. Jack and Paul Buckley, who are the best informed upon this subject of any persons in that section of Alaska, express the situation quite clearly, and need no comment:

TYOONOK, ALASKA, *October 2, 1898.*

* * * I beg to inform you that in the year 1897 I went up the main Sushitna to the Middle Fork and up that stream to its head. I was accompanied on this trip by eight companions. Our principal object was prospecting. During last summer I went up this stream as guide for the party in charge of Mr. George H. Eldridge, of the geological department. On both trips we used small boats and depended upon rowing and cordelling them. In my best judgment a properly constructed boat drawing not to exceed 2 feet of water can navigate this river (Sushitna) from its mouth as far as the forks, and from that point up the Middle Fork for a distance of about 37 miles, or to Indian Creek. The only obstacle to be overcome in this fork is a sand bar. This may not exist another season, but during this season it confined the current to a very narrow, swift channel. At no stage of water have I found this river with a channel that did not contain sufficient water to float a vessel of the draft above mentioned. The mean fall in this river from the forks to its mouth is about 3 feet to the mile. In the main fork the mean fall is about 7 or 8 feet to the mile. The current is about the same as that of the Missouri River, or from 4 to 5 miles per hour, in the main stream, and probably a mile more in the fork. The difficulty in navigating this stream will be greater in descending than in ascending. The type of boat for this stream must be a flat-bottomed, stern-wheel, with sufficient power to

enable it to be checked quickly, especially in descending the river. The principal reason for this, aside from overcoming the current and handling the boat readily, is that the channels change frequently and quickly, and freshets bring down a great amount of driftwood in the shape of large trees, which must be avoided. The changes in the channels are so easily, quickly, and frequently made that the same channel used in going up will not be used in coming down on the same trip. The total navigable distance, according to the above, is 119 miles, which a boat would have to travel at least 130 miles to overcome. * * *

W. J. JACK.

SUNRISE CITY, ALASKA, *October 20, 1898.*

* * * In regard to the navigability of the Sushitna River, it is my opinion, from the observations I have made in going up and down the river, that it could be boated safely for a distance of nearly 100 miles, say, up to the forks of the river. I should think about a 50 or 60 ton steamer, stern-wheeler, built similar to the Ohio River and Mississippi River steamboats, and drawing not over 2 feet of water, would be the proper boat to go up that river. I came down the river from the head of it in August, 1897, when the river was down very low, and I think a boat similar to the one spoken of would have no trouble in boating from the forks to the mouth. * * *

PAUL BUCKLEY.

No private concern or corporation is likely to undertake fitting out a boat for this purpose until by further development the interior of that section of Alaska is better known; or, in short, until prospecting it shows clearly that business up that stream will warrant the necessary expenditure of money. The evidence is so strongly in favor of this river being navigable for the distance named that the fitting out of a suitable steamer for the purpose is highly desirable, and such a steamer would greatly facilitate the work of exploring that section of country. The result would be that an exploring outfit could be landed far enough into the interior to make the trip across from Cook Inlet to Circle City a certainty. The point of landing would be above or through the St. Elias Range of mountains. That pack animals could be used from that point, certainly as far as the Tanana River, appears conclusively from the report of Sergeant Yanert.

Lieut. J. C. Castner's report, dated at Weare, Alaska, indicates that this trail would reach Circle City via Saljacket Creek, up which the Tanana Indians travel to that city. In addition to all this, should a steam vessel demonstrate the fact of the navigability of this river up to the point named, prospectors would be able to ship their goods to within a comparatively short distance of the most promising gold-bearing section traversed by any part of my command during last season. Finally, such vessel, when no longer needed by the United States, could be readily disposed of in Cook Inlet without great sacrifice, according to the best information obtainable.

From the report of Sergeant Yanert, who went farther than any other member of my command on the Sushitna route, it is apparent that this route should be further examined during the coming season. The nature of the country from the head of navigation, as far as explored, is in general the same as that traversed by my own party 90 to 100 miles to the eastward. The capability of sustaining stock is certain as far as investigated and a trail through this section should be established if practicable. The Sushitna valley and river have been used as a winter trail by the Tanana Indians for years. There is but little doubt that a trail for summer use can be found through this valley. We were not furnished with proper facilities for investigating this section during last season; nor did we procure the necessary animals until it was too late. At that time all detachments were out of reach except the members needed by myself for exploration up the Matanuska River.

Cook Inlet and the Sushitna River are generally open to navigation from some time in the month of April until some time in the month of October, or about five to six months of each year.

FEASIBLE ROUTES FOR RAILROAD CONSTRUCTION.

The routes described under the previous subhead, Available Routes of Travel, cover the only sections examined by Expedition No. 3 that are feasible for railroad construction. These need not be further described under this head; but it can be safely stated that the material necessary for ties, bridge timbers, etc., can be readily procured near the line of road, as can also all the gravel necessary for a road bed.

The great trouble, in fact the greatest obstacle for operating a railroad in any portion of Alaska, will be found to arise from the excessive snow falls on the coast and through the

mountain ranges. The snow slides are very numerous through the range of mountains that skirt the coast and occur with great frequency. The amount of snow deposited in the depressions by these slides is almost incalculable. The danger to life and property is not only real, but most serious. In so far as the route from the head of Knik Inlet to the Tanana is concerned, this danger is completely eliminated. The same may be said of the route up the Sushitna River; this because the valleys of these streams are so broad that a railroad constructed over either would not pass near enough to the mountain ranges.

In regard to the construction of a railroad up the Sushitna River, nothing definite is known, as no one has really attempted to go up the valley of this stream. All travel in the winter season has been on the ice of the river, and that during the summer season has been by boat up the stream itself. Such a road, to be of value, or available all the year, would have to pass down the west or north side of Cook Inlet, to some point where there is an open harbor throughout the year—certainly as far as Kanishak Bay, or even farther.

From all information obtainable, a number of obstacles of a serious nature would have to be overcome in passing down the inlet, rendering the cost of construction very great. In order to pass around the bay at Kuskatan a long stretch of marshy country would have to be crossed. The country between that and Redoubt Bay, in fact for some distance farther down the inlet, is very rough. The country from Kuskatan up the Sushitna is reported to be feasible for a railroad, but it is not sufficiently well known to state anything positive in regard to it.

SITES FOR MILITARY POSTS.

Before leaving Portage Bay, I set aside a reservation for military purposes, in the valley of Cabin Creek, which is on the north side of the bay and about 5 miles from its head. From this point commences Mr. Kelly's trail to Knik Arm. This strip of land is available for military purposes, if needed. It will be advantageous to have troops stationed there in case a trail is established from that point to the interior of Alaska. I could see no present need for troops in Cook Inlet, but directed that a certain strip of land be occupied by the detachment left at the head of the Knik Arm. Until there is more development of that country, it is impossible to state with definiteness what points should be selected for military posts. So little land in that Territory has been taken up that sites for posts can be selected without difficulty in almost any desired locality.

TIMBER.

There is a large amount of timber that will make good lumber throughout Alaska. The principal varieties of trees growing in the section traversed by my command were the fir, spruce, pine, four or five varieties of cottonwood, and birch. Throughout the Matanuska Valley, the birch and cottonwoods predominate, although some spruce and fir are to be found, especially near the mountains on either side.

In the valley of Cabin Creek, in Portage Bay, there is about 100 acres covered with a dense growth of large spruce and fir trees that will make excellent lumber. This is about the best lumber actually seen by the command near the coast, although plenty of it can be found in the valleys of all the streams. After passing the head of the Matanuska River, and up to the foothills of the Alaskan range of mountains, the trees are much smaller. In fact they are quite scrubby. In the valley of the Chestochena we found some large fir and spruce trees that would make excellent lumber. Throughout the entire valley of the Delta River trees were found suitable for lumber.

FUEL.

In addition to the trees, there are to be found in Alaska immense deposits of coal. The most extensive of these are found in different parts of Cook Inlet. The most extensive outcrop of this coal observed by me was in Kachemak Bay, a few miles above Homer. This I have previously mentioned and described. Above this, and about 2 miles from Tyoonok, there is another outcropping of coal that I made an examination of. It is to all appearances a lignite, but partially consolidated. An examination of it shows that it retains very perfectly the original

woody structure. The amount of ash from it is large and contains a number of impurities. Nevertheless, this coal has been frequently used by the steamer *Perry* for steaming. The engineer of that vessel informed me that it was entirely satisfactory for that purpose, although not quite so good as that taken from "coal point" in Kachemak Bay.

I brought out with me a sample of coal taken from a point about 12 miles directly in rear of Tyoonok which looks very much like the coal found in Kachemak Bay. In conversation with Mr. Hannero, the agent of the Alaska Commercial Company, at Tyoonok, he informed me that he had traced this seam for nearly 600 miles. This or some other seam certainly crosses Cook Inlet at one or more places, as one finds large blocks of coal washed up on the beach after each tide has ebbed. This is particularly noticeable after a heavy or severe storm. Throughout the valley of the Matanuska we found coal of the same general appearance as that found in the inlet, but I saw no seams that were large enough to possess any special value commercially. Larger beds were reported, but were not seen by any member of the command. Near the head waters of the Tazlena other and similar coal was found as float, but no seams were seen by any of us. Coal was reported by the party under command of Lieutenant Learnard upon the tributaries of the Sushitna River.[1]

MINERAL RESOURCES.

The following is a brief résumé of the mineral resources of the region covered by the explorations of Expedition No. 3 during the summer of 1898 by Mr. W. C. Mendenhall, of the Geological Survey, who was attached to this command as geologist:

The northern end of Kenai Peninsula and the adjacent mainland are made up of the rocks which yield the gold of the Sunrise City mining district. Thus far development is limited to placers, and no veins of sufficient richness and extent to justify vein mining have been found. The placer deposits yield up to as high as $1.20 per day per man, but as a rule are of low grade, and this, with the very short working season, means that comparatively few claims are profitable. As a rule, the region outside of a radius of 30 miles from Sunrise has not been prospected thoroughly, and there is still much territory within this radius which is untouched. In the valley of the Matanuska and Lower Sushitna, and extending perhaps as far north as the Tazlena drainage, is another gold field of different origin and as yet but little exploited. The rocks are more recent than in the Kenai field, and the gold seems to be associated with a series of basic dikes. From the little known of this field it seems unlikely that it will prove valuable until it becomes possible to work with profit gravel of much lower grade than can be handled with the present economic development of the region.

Although a belt of well-mineralized schists extends across Delta River, it seems from the evidence now available that it is not auriferous, or at least not sufficiently rich to justify expenditure of capital in its development. Apart from these areas, there are no rocks known in the region examined by the geologist which carry gold. Over the greater part of the country, however, a sheet of gravel is spread, largely glacial in origin, which everywhere bears gold in small quantities, and is probably the source of the colors which reward the prospector, who washes a pan of gravel along any of the large streams, or even on the present benches. This gold, always fine, always limited in quantity, proves a veritable will-o'-the-wisp to the prospector. It gives him false hopes, and leads him to think that surely he must soon find the source, where the gold is heavy and in paying quantities. He never finds it. In some favored localities these big gravel banks may prove profitable to work by the hydraulic method, but the few efforts thus far made have ended disastrously. The gravels occur all about the head of Cook Inlet, for some distance up Matanuska Valley, and continuously across the high tundra from the northern slope of the Coast Range to the southern limit of the Alaskan mountains, so that Delta River takes its source in them and again cuts through them in its lower course.

Coal occurs in the Matanuska Valley, and rocks which may carry it are found in the upper drainage basin of Tazlena River. The seams examined were thin and therefore commercially

[1] NOTE.—For analysis of the Cook Inlet coal, see Report on Coal and Lignite of Alaska, by William Healy Dall, Government Printing Office, 1896, pp. 796–797, 828 et seq.

valueless, but prospectors report heavier beds at some points, as on Chicaloon Creek, and on Coal Creek, a small tributary of the Matanuska which enters the latter stream from the south bank, opposite the mouth of Chicaloon. Nothing can be said about the quality of these coals, because there was no opportunity afforded for personal examination. The 4-foot bed of lignite, which occurs in the beach bluff a few miles below Tyoonok, is but partially consolidated, retaining very perfectly the original woody structure, and because of the high ash and other impurities, will never have other than a purely local use. No coals and no rocks likely to carry coals were found north of the Coast Range.

PRODUCTS.

Along the seacoast of Alaska two very important elements enter into and have a controlling effect upon the growth of the cereals and vegetables cultivated. The first is the Japan current that flows past the entire coast from a short distance above Cooks Inlet; and the other is the amount of sunshine during the summer months. During the months of May, June, July, and August there is scarcely any part of the day when it can be said to be dark. Either the sun is shining or there is twilight. As all vegetation grows much more rapidly in northern than in southern climates, or toward the equator, it is but natural that we should expect to find that some of the cereals, and hardy vegetables, would do well in Alaska. The Department of Agriculture has been making experiments for several years past in the vicinity of Sitka, and intends, during the coming year, to extend this work to other points, including at least one station in Cook Inlet. I am indebted to Prof. C. C. Georgeson, who is in charge of that work, for the following information as to the result of experiments last season, viz:

VEGETABLES.

The climate and soil were favorable to the growth of all the vegetables tested except spinach and wax beans. These two crops were a partial failure, although both could be used. All vegetables in the following list were grown on old ground in Governor Brady's garden, with the exception of the cabbage, which was transferred to Japonski Island. Vegetables planted on new ground were failures because of the acidity of the soil. Asparagus, white mammoth; wax beans, three varieties; beets, three varieties; cabbage, three varieties; cauliflower, two varieties; carrots, two varieties, which were seeded on May 23; cress, one variety, which by the end of July had all gone to seed. Kale, one variety, transferred to Japonski Island in the same manner as cabbage and produced a good crop by the end of October. Kohlrabi; lettuce, three varieties; mustard, yellow California; onions, white Portugal, mammoth silver king, extra early red-flat, yellow danvers, and top sets; the last named do well. Parsley, triple curl; this valuable vegetable for soups and dressing meats produced an extra growth. Parsnips, hollow crown; this likewise did wonderfully well. Peas, twelve varieties; all of these varieties grew well and were fully as productive as those in any part of the States. Radishes, French breakfast, early scarlet, turnip, white tipped, olive shape, and long scarlet. Nowhere do vegetables grow better or produce crisper roots than do all these varieties. Ruta-bagas, three varieties; all of these grew as well as they would anywhere. Rhubarb, victoria; rhubarb is one of the vegetables which has long been cultivated in Sitka, and a few plants can be found in nearly every garden, where they continue to grow from year to year without any further care than that of gathering the stems when wanted for pies. Salsify, large white; spinach, two varieties; the seed germinated, but for some unknown reason only a few of the plants amounted to anything. Sage; thyme; the seed did not germinate well, but a few little plants were produced ready for transplanting next year. Turnips, three varieties; no vegetable grows better in Alaska than the turnip, and it does not grow as well anywhere else as it does in Alaska. The roots attain a phenomenal size in a very short time. Windsor bean, large English; this staple and hardy bean was planted in poor, sandy soil; nevertheless, the plants attained a height of from 3 to 4 feet and produced an abundant growth of well filled pods before frost.

Besides the above list of vegetables some potatoes were planted which produced a very good crop, but not so good as I have seen in many other parts of Alaska. They were planted on a knoll of new and poor land. The potato is one of the crops that can be depended upon in all parts of the Territory. It is grown by the white people everywhere, and frequently they have no other vegetable. During the late years the more enterprising of the Indians quite generally raised a patch of potatoes. Those which I saw growing in good soil about Sitka were of excellent quality, mealy, and of good flavor.

Substantially the same list of vegetables was grown at Skagway, but with not quite so good results, as the ground was new, raw, and had not been exposed to the sun's rays for an extended period. It was necessary to remove a covering of moss, rotten wood, and similar vegetable débris before being able to plant. Also, at Juneau, and in the following-named places in Cook Inlet, viz, Kenai, Ninilchik, Tyoonok, Hope City, Ladds Station, and on Kadiak Island.

Reports to the Department of Agriculture show that good results have been obtained at Pearl Island; Nushagak, on Bristol Bay; Unalaklik, on Norton Sound, and at a point in the interior 300 miles from the mouth of the Yukon, where the season was so short that all vegetables sown did not fully mature. But the Early Rose potato yielded 200 bushels to the acre; turnips grew to weigh over 5 pounds, and ruta-bagas, cabbage, cauliflower, beets, carrots, celery, parsley, rhubarb, and lettuce did well.

Experiments that have been made with the cereals by this Department, and by individuals with whom I conversed in Cook Inlet, indicate that oats and barley will not only mature, but will give a heavy yield to the acre. Sufficient experiments have not been made with wheat, but success in producing this in Cook Inlet is certainly very problematical on account of the shortness of the season. There is but little doubt that buckwheat and flax would do well in certain parts of Alaska where the soil is properly selected and prepared. Nearly all varieties of clover have been experimented with successfully.

I am satisfied, from a careful examination of the valley of the Matanuska River, that a very large acreage can be devoted to agriculture. The upland throughout this valley, as far as the Chicaloon Creek from a point just above Fire Island, is very good soil. This soil extends as far back from the river on the north as the mountains, and which has an average width of something like 20 miles. In this district not only was the soil quite rich, but there was every indication of a season sufficiently long to permit of raising everything heretofore grown in and around Sitka.

There is found growing wild, in all parts of Alaska visited by me, a variety of berries, such as strawberries, raspberries, whortleberries of several kinds, moss berries, marsh berries, currants, high-bush and low-bush cranberries. It is a favorite remark made by the residents of that section that every berry growing in Alaska is not only safe but good to eat. Among the vegetables growing wild in Alaska I noted specially a wild celery that the Indians constantly make use of for food, and members of the command ate it with relish while in the interior.

ANIMALS FOR TRANSPORTATION AND THEIR SUSTENANCE.

From what has been said under the previous head concerning the raising of cereals, it is evident that both horses and cattle can be wintered in Alaska, and the results accomplished with pack animals in going into the interior, where they live solely upon the grasses of the section passed over, indicate that both horses and mules can be readily and safely used for draft or pack purposes during the summer season. Not enough attention has been paid to the raising of oats, barley, or the clovers, as yet, to depend upon local production for the use of stock during any part of the year. Should enough of these animals be imported into that section to warrant it there is but little doubt that parties interested would produce the desired food. Excellent hay can be cut in many parts of Cook Inlet, as well as at some points in the interior.

Not having had sufficient experience in traveling in that section during the winter months to form a positive opinion upon the subject, I hesitate to state what animal would be best suited for use during that season of the year. Both reindeer and dogs are used by those who travel in Alaska every winter. The Indians in and around Cook Inlet and all of the natives with whom I came in contact from the interior made use of dogs. As the moss and other food consumed by the reindeer grow in abundance in that section of the country where the caribou abound (they are almost identical with the reindeer in shape, as well as in habits and general appearance—in fact some wild reindeer are actually found), no good reason is apparent why these animals should not be made use of for transportation during the time that snow is upon the ground. I understand that these animals require cold weather, and are not of much value for packing or hauling during the summer. This is true also in regard to dogs.

Summer transportation resolves itself, therefore, into either packing or hauling with the horse or mule. Our experience with the two (we had both in each train) led us to choose the former, mainly for the reason that having larger feet he could pass over soft ground much better than the mule. In concluding this subject I am quite positive the grasses in that portion of Alaska through which I passed are of such quality and in such quantity as to warrant the shipping of cattle to the Yukon mining district overland from the head of Cook Inlet, and from thence

up the Matanuska, and thence over the trail followed by my command. Not only will beef cattle go through that country safely, but they ought to fatten on the road going over. I had employed, as a packer with the command, a practical cattleman. He assured me, after carefully examining the country passed through, that the foregoing statement was a conservative one. To make such a trip a success the stock should land at the head of Cook Inlet as early in the month of May as practicable and be sent across by easy marches, and arrive at Forty Mile by the middle of August. This precaution is necessary in order to prevent their eating frozen grass after the 25th of August.

The animals lost by my own command, and doubtless those lost by Lieutenant Castner after leaving me at Camp Separation, were more affected by eating frozen grass than anything else. It is true Lieutenant Castner attributes the weakness and subsequent death of his two mules to being chilled while crossing the Tanana River; but their actions, as described by him, correspond so nearly with the actions of those lost by myself, that I believe that my views on the subject are correct ones.

NATIVES.

Located in Cook Inlet are a number of Indians and Russians. The last named are to be found principally at Ninilchik and Kadiak Island. These are largely half-breeds. At the first-named place I was informed that they are principally descendants of a Russian woman who was captured by the Indians from Yukutat many years ago, when all of the inhabitants of that place, with the single exception named, were killed. These people do not possess the confidence of the Americans located in that section. On the contrary, they are said to be deceitful, trifling, and lazy, with a strong and almost ungovernable desire to steal and to lie. Those with whom I came in contact were also cowardly in the extreme.

It is but natural that these people should inherit some of the worst traits of the Indians, from whom they are descended. It is quite certain that up to within the last few years all of the Indians in that section were considered light fingered. Such is not the case now in so far as the Coast Indians are concerned. The representatives of the different trading companies have bent their best energies toward breaking up this tendency, and with such marked success that one can now leave his house, or tent, containing his belongings, unlocked at all times with perfect safety. Furthermore, when an article is lost by any one and is subsequently found by one of these Indians, it is practically certain that the owner will find it in the possession of the agent, to whom it has been handed by the finder, knowing that he will be suitably rewarded for so doing.

I shall make no attempt to classify these Indians into tribes, as this has been done repeatedly by those who have made them a special study. It is sufficient for my purpose to state that the general characteristics of all the Indians on the coast are much the same. (93—100.) They are all of rather small stature, with features very similar to the North American Indian, especially as to the high cheek bones. Among those located in Prince William Sound were some who had a decided Japanese cast of countenance. They are, as a general rule, quite indolent, depending largely upon hunting and fishing for a livelihood. I was especially struck with their indolence during the fishing season. Instead of providing themselves with all the fish needed for winter use, they idled away their time principally in sleep, varying it with an occasional repast of fish.

I saw enough fish thrown away at Ladds Station, perfectly good for food, or Eukla, which is the dried fish (101), to have supported all the Indians located at that station during the entire winter. All that was necessary for them to do was to gather it up and dry it, yet they did not attempt to save one. In addition, they were too indolent to gather up anything like a sufficient number of the candle-fish that appeared in such countless numbers on the beach during the season of their run.

The ease with which the natives of Cook Inlet can obtain their living is most remarkable. It reminds one of the divine provision made for the children of Israel in their wanderings through the desert when the Lord provided manna sufficient for each day's consumption. In the

case of these Indians the fish are so abundant that the waves actually wash them on the shore, where only a few minutes of each day is required to gather more than a sufficiency. Besides, the same waves wash upon the same beach coal in abundance, not only for present needs in cooking, but for future use during the cold winter months. And yet, as above stated, they are too lazy and indolent to gather it.

Many, if not all, of these Indians can be made to work. Some of them do work, but only when hungry. The time has now arrived when some attention should be devoted by the United States to all of the Indians located in Cook Inlet. They can not much longer depend upon hunting for a livelihood, as the fur-bearing animals are fast becoming extinct, and the same is true of the game. Then, too, if the fishing business is carried on in the future as it has been in the past this source of supply will be cut off in much the same way. I do not advise that they should be supported by the Government, as this policy would result in their remaining improvident and shiftless for all time, but they should be taken charge of to the extent of requiring them to provide themselves with their usual food so long as it can be obtained.

They should be taught also something about agriculture, and made to follow it to a sufficient extent, at least, to provide against starvation. Schools should be established at the different points where the natives, both Indians and Russians, are collected in sufficient numbers to warrant the services of a teacher. In these schools they should be taught and made to speak the English language. Schools could be advantageously located at the following points, viz: Kenai, Tyoonok (this would accommodate the few now living at Ladds Station), and Sushitna Station, and Knik Station. No schools have ever, in so far as I could ascertain, been located in Cook Inlet. When so located, every child should be required to take advantage of the facilities offered.

Some capable person should be placed in charge of all the Indians in that section of the country with absolute power to control them. Until thoroughly established, the person designated for this work should be an officer of the United States Army who possesses the required qualifications. No great amount of discipline will be required in controlling the children in that section. I saw them constantly at play with each other during my stay in the inlet, and not once did I see a quarrel of any kind among them. They were at all times laughingly good-natured and very considerate of each other. So striking was this fact that it was noted as being worthy of emulation by many American children.

Notwithstanding the fact that the Russian priests have endeavored to instili into the minds of these natives a hatred and distrust of the Americans, it is gratifying to be able to state that they have not succeeded. All the natives with whom we came in contact displayed the most kindly feeling toward prospectors and others who visited Alaska. This fact is specially noted by Lieutenant Castner in speaking of the Tanana Indians, who unquestionably saved the lives of himself and party.

A TRIP FROM PORTAGE BAY TO TURNAGAIN ARM AND UP THE SUSHITNA.

By Lieut. H. G. LEARNARD, Fourteenth Infantry.

My instructions were of a generai nature, the details being left very largely to my personal discretion. It was desired by my commanding officer that I should find an overland trail from Turnagain Arm to a point of the Knik River known as Howe's Station. It was believed by Captain Howe that there was a trail known to the Indians, which he (Howe) believed went up Bird Creek. If I should succeed in finding this trail I was expected to follow it until Captain Howe recognized the country up to his station. Having performed this duty, my orders were to return to the camp of the command.

The personnel of my expedition, in addition to myself, consisted of Corporal Young, seven enlisted men, Captain Howe and his son, and Mr. Mendenhall. The expedition was provided

with ten days' rations and tentage. The members of the expedition were also provided with four sleds and five pairs of snowshoes. I was cautioned not to permit my advance party to get too far from their base of supplies. On May 30, 1898, I was instructed to proceed from Resurrection Bay to Sunshine City, on the Turnagain Arm, to ascertain if a practicable trail could be found. On June 19 I was instructed to proceed up the Sushitna River on board of a Columbia River boat belonging to the Alaska Commercial Company as far as the Wasili's cabin on the Talkeetna River. At this point I was to establish a base of supplies for myself and an additional base of supplies for the detachment under Lieutenant Castner. Subsequently I was directed to explore the Sushitna River and the country toward the north, or to the Tanana River. In all this exploring work I was to be guided by the general instructions incorporated in the report of Captain Glenn.

I left the main camp at Portage Bay the latter part of April, when I proceeded across the glacier at the head of the bay, and about 1 mile beyond the head of Turnagain Arm. The party consisted of Mr. Wallace Howe, a civilian employee, Private Matlock, Company D, Fourteenth Infantry, and myself. Two additional men were taken as far as the summit of the glacier to assist in pulling the hand sled. The glacier is 4¼ miles wide, and the highest point crossed had an elevation slightly less than 1,000 feet above sea level. The grade from the Portage Bay side is very steep in places, so steep, in fact, that most of the miners used a block and tackle to get their supplies to the top of the first bench. After that point is reached, the grade is not steep and the summit is reached about a mile from the beginning of the glacier. The foot of the glacier is about three-quarters of a mile from salt water, on the Portage Bay side, and no difficulty was encountered in reaching that point. From the summit the grade is very gentle. After leaving the glacier the trail enters a valley, about 2 miles wide, through which flows a stream from the glacier to Turnagain Arm, about 7 miles from the foot of the glacier. Turnagain Arm, a bay of Cook Inlet, has several streams flowing into it at the head; all but the one marked Quartz Creek have glaciers at their head, or on their tributaries. Turnagain Arm, at the head, was full of stranded cakes of ice at the time of our arrival. Camp was made the first night about 2 miles from Quartz Creek, among some stunted spruce trees. The following day I went to Quartz Creek and there found 200 miners encamped, all bound for Sunrise City, about 15 miles west on Turnagain Arm. Most of them were new men and knew nothing about Alaska prior to coming to it, but among the boatmen were a few old residents, and from them I learned that no one knew of a way to get to Knik by way of Twenty-Mile River, and all considered it impracticable because of the mountains between the two places. However, every one recommended Mr. H. H. Hicks as the best authority on the country along the Matanuska and the Knik rivers, and if information about the Sushitna River was desired, then Mr. Jack was the man to see, as he had made a trip up that river the preceding summer. Neither of the gentlemen referred to were then at Quartz Camp, and no one knew when they would be there.

While at Quartz Camp it was ascertained that a poor trail existed from there to Sunrise along the beach, and that in the summer time there was a pack train trail up Quartz Creek and then down a tributary of Six Mile Creek. The usual way to go from Quartz Camp to Sunrise City is by boat, but the boatman should understand Turnagain Arm, as the water of that section is very treacherous. Turnagain Arm has a bore tide, which with the so-called "tide rips," makes it extremely dangerous for a small boat, even with no wind blowing. The Arm is full of quicksand, and when the tide is out it is nearly bare. There is said to be a difference of nearly 60 feet between extreme high and low tides.

When I returned to the camp of the day before I found some trouble in reaching it, because the snow had become so soft that traveling upon it was very difficult. All the streams flowing into Turnagain Arm, at its head, run through valleys from 10 to 20 miles long, and from 2 to 4 miles wide, but with the exception of the valley of the stream flowing along the trail, all of them were filled with swamps, as far as could be determined. I then started back to the main camp, but when we reached a point about a mile up on the glacier the party under command of Corporal Young was met, bringing instructions for me to return to Turnagain Arm and try and find a route to Knik by way of Twenty Mile River, or some stream at the head of the Arm.

The members of Corporal Young's party were nearly exhausted when we met them. They had breakfasted at 4 in the morning, and as they expected to reach camp early in the day they had not cooked anything to eat on the way. I gave them such cooked rations as my party had, and then started for the first timber, some 4 miles away, to make a camp for the day. This point was reached about 3 o'clock in the afternoon. Our progress was slow, as there were but two men to each heavily loaded sled. The next day camp was moved about 4 miles to the head of Turnagain Arm. (1*a*.)

Two soldiers were sent back, as traveling was now safe, with a report of the condition of the party, the latter written while I was suffering from snow-blindness.

As the snow was melting very fast, and as nothing could be accomplished under the present conditions, I decided to return to the main camp. Before returning, however, I sent Mr. Howe and two soldiers up Twenty Mile River to ascertain the conditions. They returned about 4 o'clock, having been gone eight hours and having been unable to ascend that river but 4 miles. They all reported that the valley of this river was nothing but a swamp, and that at present it was impossible to ascend it. A party of hunters, who had been up that stream about 15 miles, stated to me that it was too late to try to go up there until after the snow had gone and that then a boat would be needed, as the valley of the stream was an almost impassable swamp. While at Quartz Camp I was informed that Indians at times go from a point opposite Sunrise City to Knik, up one of the streams flowing into the Arm. While there I learned that among some of the boatmen there was a disposition to charge a Government employee more than any other person.

On May 7 I started for the main camp, leaving two soldiers to guard the property. The returning party consisted of nine men, who for baggage had their bedding and one sled. While a start was made at 4 o'clock, camp was not reached until twelve, by which time every one was thoroughly worn out. (2*a*.) Most of the snow had disappeared from the valley, and it was very soft on the glacier. A snow slide had recently crossed the trail on the Portage Bay side, and some apprehension was felt while passing through the short canyon at the foot of the glacier. Snow slides were of almost hourly occurrence on the mountains in the vicinity of Spruce Camp, the season there being much farther advanced than at Portage Bay. If the party had reached Twenty Mile River about two weeks earlier it would have been possible to have gone up that river on the snow with comparative ease.

On May 30, 1898, a party consisting of Mr. Mendenhall, a member of the United States Geological Survey; Mr. Bagg, a civilian employee, and myself landed at Resurrection Bay, with orders to go to Sunrise City, Alaska. (3*a* and 4*a*.) A start was made on the morning of May 31, each member of the party carrying, in a pack on his back, the necessary bedding, his proportional share of the cooking utensils, ten days' rations, and such other personal articles as were desired. The packs averaged 60 pounds at first, but grew lighter each day.

There are four or five houses at Resurrection Bay occupied by Indians or squaw men, who at the time of our arrival were busy planting a few potatoes and some hardy vegetables in small gardens. A small boat was secured to land the party at the head of the bay, distant about 4 miles from the place of landing for steamers. The head of Resurrection Bay is quite swampy and has several small streams flowing into it. A trail used by miners going into the Kenai Peninsula this way was soon struck and followed up, and in about one-half mile from the starting point it developed into a very poor road. This road was constructed by a California mining company, under the management of Mr. Shackleford, at the expense of a great deal of time and labor, for the purpose of hauling the company's mining stores this way. The road followed up Salmon Creek. This is ordinarily a small stream, but at this time it was much swollen from melting snow and ice. The grade was in all cases gentle as far as Salmon Lake, at that time the terminal point. (5*a*, 6*a*, and 7*a*).

During the first day much inconvenience was experienced in fording the creek, the water of which was icy cold, waist deep at times, and frequently swift. The road frequently crossed from one side to the other, necessitating considerable fording. A camp was made the first night about 2 miles south of the lake (shown on the map), at the mining company's camp, where we

were well treated and for which we were under many obligations. The following morning a start was made, and after traveling about 2 miles we came to the end of the road, and crossing the creek took the ridge on the west bank of the lake. The route was quite rough as far as the head of the lake, but not so much so as to prevent the construction of a good wagon road at a small cost.

From the head of the lake a trail led over the divide and down to the small lake shown on the map. The divide had, at its highest point, an elevation of 1,200 feet above the sea level, which was an increase of 800 feet over the level of the first lake, all in about three-quarters of a mile. In one place the grade was so steep that everyone was glad to have the assistance of a rope. A better grade could be found by taking time to look for it. At the foot of the lake on the north side of the divide some miners were found encamped, among whom were members of the California company. On the summit of the divide and on the north side of the same plenty of snow and ice were found, while on the south side very little of either was seen. Camp was made for the night at the lake on the north side of the divide, and while a small amount of rain fell, no inconvenience was experienced because of the thick foliage of the trees. Because of their weight the party took no tents. Fortunately rain fell but once during the entire trip. The next morning, having proceeded to Snow River, part of the way on the ice of one of the lakes and over the snow, we embarked in a dory with the owners, Messrs. Roble and Stetson, and a man named McCrea. A good trail could be constructed from the divide to Snow River, with little trouble. The current in Snow River was very strong and the descent was made in about two hours, or at the rate of 6 miles an hour. The stream has a glacier on it, about 10 miles above the point where the trail struck it.

The river flows through a valley several miles wide, limited on the east side by a chain of mountains about 3,000 feet high, although some peaks have an elevation of over 5,000 feet. The river has several shallow rapids, one or two of which came near upsetting us. Once, when we got out of the main channel and ran into some driftwood the boat almost upset. The river contains many small islands, and in consequence the amount of water flowing through any one channel is not great, while if it was all confined to one channel it would make a good-sized stream. About 12 o'clock Lake Kenai was reached, where a stop was made for dinner at a log cabin recently built by miners. Several miners started down the lake in a sailboat and on rafts as we arrived. Before starting down Lake Kenai a small sail was rigged on the boat, and, as a good fair wind was blowing, the first 6 miles was sailed in about an hour. The dory was loaded down to within about 6 inches of the water, so that we could not stand a heavy blow. On rounding the first turn the wind died out for a while, but the small island in Lake Kenai, named Porcupine, was reached about 4 o'clock. After making a short stop there we proceeded down the lake. We arrived at camp, about a mile beyond Quartz Creek, about 9.30 in the evening, having stopped on the way to shoot a brown bear seen on the mountain, which delayed us about two hours.

It is very doubtful if a wagon road could be constructed along the shore to Lake Kenai, because the mountains in several places rise straight up from the lake, and then snow slides are very frequent in places, many of which come down on the lake. Great swaths were cut out of the timber on the mountains by the slides which have taken place in the past. The mountains are very rugged and broken, and have an average elevation of about 350 feet. Besides the glacier on Snow River, I was told that there were glaciers on Copper and Trail creeks, or tributaries. So much glacier water flowing into Lake Kenai discolors the water, causing it to have a whitish appearance. Kenai Lake is about 30 miles long and has an average width of from 1½ to 2½ miles, although at the bends it is wider. It is reported to be very deep, and the fact that it lies between mountains, some of which rise straight up from the water's edge, would tend to confirm this report. The scenic effect along the lake is very fine and grand, but at places very desolate and dreary, especially where the mountains are so steep and barren that even grass and bushes will not grow.

Mr. Roble said that a trail up the creek marked Trail Creek and then down a tributary of Six Mile is occasionally used, but that generally in the fore part of June there is more snow

there than on the trail up Quartz Creek. The pass he described as being low and not difficult of approach. Mr. Stetson said that there was a pass up the creek marked Juno Creek on the map, and after crossing the divide the trail led down a tributary of Resurrection Creek to Hope, a small mining village about 10 miles west of Sunrise City. We were much indebted to Messrs. Roble and Stetson for passage down Lake Kenai. If we had been compelled to make it on foot, along the shore, the journey would have been almost impossible.

From what one could see on the way down Lake Kenai, there were low gaps between the different peaks. This seemed to be quite characteristic of all the mountains I saw in Alaska. Kenai River flows out of Lake Kenai, and then through Lake Skillakh, which was stated, by men who had been to it, to be about 60 miles long. From the latter lake the river flows into Cook Inlet, near old Fort Kenai. Small boats have descended the river in safety, but I have been informed that there are very dangerous rapids on it, and that several men who were not acquainted with the river have lost their lives while trying to descend it. The next morning after arriving at Lake Kenai Mr. Bagg and I continued the trip toward Sunrise, while the balance of the party, including Mr. Mendenhall, who wished to examine some gravel banks at Juno Creek, continued on down to the foot of the lake, where some mining operations were in progress. A trail leading up Quartz Creek was struck about a mile from camp and followed. It was very poor because of the fallen timber, moss, and the soft nature of the ground, as it led along the banks of the creek.

Quartz Creek flows through a valley about 2 miles wide at its mouth, which valley gradually widens until about 8 miles up, where it ends in a narrow canyon. The creek is very swift, but narrow, and does not carry much water. It is of no importance unless mineral wealth should be found in it or its tributaries. Probably a better trail could be located than the one we followed, by going up on the bluffs along the valley of the creek, where the timber had been burned off. At the canyon it was necessary to take the high ground, several hundred feet above the level of the creek, and to do so one had a very steep grade to overcome, which Mr. Mendenhall said could have been avoided by taking the high ground sooner. About a mile beyond the beginning of the canyon Gulch Creek flows into Quartz Creek through a deep canyon. This stream is full of rapids and, because of its swift current, unfordable. We experienced some difficulty in crossing it, but Mr. Mendenhall, who crossed farther to the west, reported that he had found a very good place to cross.

About a mile and a half beyond Gulch Creek the trail followed close to Quartz Creek and on very level ground. From there on a very good trail of road could be constructed without difficulty as far as Mills Creek, with the exception of a short distance along the upper lake, at which point the mountains rise close up to the banks of the lake. Snow slides would bother some along the lake. Probably the greater portion of the season when these occur, danger from them can be avoided by traveling on the ice on the lake. The divide between Quartz and Canyon creeks was so gentle that the first sure sign that we had crossed the summit was when the water was seen flowing to the north instead of to the south. For about half a mile on each side of the divide there was a good sized marsh which reached nearly across the pass. The latter is about 1 mile wide. The summit had an elevation of about 1,450 feet, which was nearly that of the timber line. The second camp from Lake Kenai was made at the first lake beyond the summit of the divide. From Lake Kenai to the summit the country was well timbered, but from that point to Mills Creek there were many open patches, and the timber was smaller than on the other side of the divide, probably due to the fact that one had a southern slope while the other had a northern.

At the junction of Canyon and Mills creeks there are several cabins; some mining was going on, and there was a pack-train trail to Sunrise City. Two trails to Sunrise City leave the upper fork, one on the east side and the other on the west side of Canyon Creek. We started to follow the trail on the west side, but after following it about 3 miles it crossed to the east side and the trails ran together from that point to Sunrise City. The lower fork, or the junction of Canyon and Six Mile creeks, was reached about 9 o'clock in the evening. The trail between the two forks is scarcely worthy of the name, for while it is true that pack animals with loads do

travel over it, yet there are places on it that a man can only get around with difficulty. The greater part of the way the trail is along the side of the mountain several hundred feet above Canyon Creek, and in many places snow slides have swept across it down into the creek. Without the outlay of large sums of money and much time it would be impossible to build a good wagon road between the two forks. At the lower fork there were several log cabins, an eating and bunk house, and a small store. While eating supper we were joined by Mr. Mendenhall and Mr. McCrea, who had made the trip from Lake Kenai in two days. McCrea after eating supper proceeded to Sunrise that night. The following morning we continued to Sunrise, arriving there about 2 o'clock in the afternoon. The trail was much better than that of the day before, only two or three bad places being found, and these could be fixed without much trouble. The grade was not steep, especially for a mountainous country, and if it were not for the mud and water along the trail an animal could carry a good load without difficulty.

While at Sunrise, in a conversation with parties who had recently been in the Lake Kenai country, I learned that the wagon road from Resurrection Bay had been extended to the head of Lake Kenai, following the trail already described, except that it kept to the west of Snow River. The same parties informed me that the trail from Mills Creek, or the upper fork, had been extended to Lake Kenai, and that pack animals with loads had made trips over it during the summer. Pack animals made the trip between the two points, but were floated down Lake Kenai on a raft. From the lower fork a trail leads up 6 miles to one of its tributaries called Lynx Creek, where some claims are located. This trail is reported to be poor. Packers charged 6 cents a pound to take freight from Sunrise to the upper fork, and only about a third as much to the lower fork, although the distances are 18 and 10 miles, respectively, from Sunrise. The lake and its tributary streams are more accessible by way of Resurrection Bay than any other, the grades being less that way and there being a wagon road and pack-train trail. Before the construction of the pack-train trail between the forks of Six Mile Creek, Mills Creek was reached from Hope by the pack train going up Resurrection Creek at Hope and then crossing from one of its tributaries to Summit Creek, the first tributary of Canyon Creek from the west, below Mills Creek. During the winter, travelers from Resurrection Bay to Sunrise or intermediate points travel on the ice over the various streams, thereby avoiding all steep grades. Mr. Mendenhall did the topographical work for the party, for which I am much indebted to him, and Mr. Bragg was of much assistance in various ways. The trip was made in seven days, but as no steamer could be taken from Sunrise until the evening of the 8th it was not until the next morning that the party arrived at the main camp at Ladds Station on Cook Inlet.

Pursuant to instructions, a party under my charge, consisting of Sergeant Yanert, Eighth Cavalry, Acting Hospital Steward Neville, Privates Fels, Gamble, Jones, and Matlock, Fourteenth Infantry, proceeded on board a Columbia River boat, sailed by Mr. Johnson, the Alaska Commercial Company's agent at Knik, Alaska, and started for the mouth of the Sushitna River, 25 miles north of Ladds Station, at 1 o'clock a. m. June 20, 1898. For a short distance after leaving Ladds Station it was necessary to row, but soon the tide commenced to run strong, a breeze sprung up, and in consequence we arrived at the mouth of the Sushitna River about 4 a. m., before a sufficient amount of tide had come in to make it possible to enter the river. By this time a strong wind was blowing, which, against the current of the river, kicked up a heavy sea, and for a while it was doubtful if the boat could be kept from going ashore on the bars, which Mr. Johnson said would have probably resulted in the drowning of the party. As soon as it was discovered to be impossible to enter the river, the boat was headed down the inlet. With a strong wind and tide against it, the boat could scarcely hold its own until about half past five, when, having drifted under the protection of a point and into calmer water, a landing was effected at the mouth of the Chuitnacocks River, about a mile below the entrance of the Sushitna River.

Breakfast having been prepared and eaten, everyone slept until 5 in the evening, when, the tide being about two-thirds in, another start was made for the Sushitna River, the bars of which were crossed without difficulty. On the way in the boat passed through a large school of Beluga whales, sometimes called the white whale, several of which were not more than 100 feet

from us. After proceeding up the river about 3 miles, a landing was made on one of the flats, but the mosquitoes being so bad we hastily pushed out into the river and another camping place was selected about half a mile farther, on an island in the middle of the river. There was very little improvement here, as the mosquitoes swarmed everywhere along the river. The entrance to the river is very crooked, and entrance into its mouth is attended with danger at times. But there is no difficulty if the tide has come in sufficiently and the person navigating the boat understands the channel. The banks of the stream at the entrance are very low and heavily timbered with a dense growth of cottonwood and underbrush. The river flows into the inlet through a very large delta, many miles in width, through which it discharges a large volume of water containing a great deal of sand. Near the sea occasional patches of grass were seen which would afford fine grazing for stock.

Owing to light winds slow progress was made, only about 7 miles being traveled on June 21, the greater portion of which distance was made by the use of the oars. After traveling about 3 miles that day we arrived at a small stream called Alexanders River, named for an old Indian chief, who lived about a quarter of a mile above its mouth. This stream was the last clear-water stream seen for several days, and as we were informed that such would be the case all buckets were filled with clear water. During the day we sailed by Mount Sushitna, which was about 10 miles to the west. This mountain stands by itself, as if to guard the entrance of the river. Seen from near Ladds Station one is led to believe that it stands at the mouth of the river. It is, however, some distance to the west, but in ascending the river all sides except the extreme western one can be seen. (8a.)

On June 22 the party reached the Alaska Commercial Company's store, about 8 miles up from the camp of the day before and about 23 miles from the mouth of the river. The store stands on an island in the middle of the river, which at this point is about three-quarters of a mile wide and 90 feet deep in places. Several Indian cabins stand near the store, with others on both sides of the stream a short distance above the store. Near it the first rocky and bold banks of the river were seen. A stop was made here for the purpose of securing an Indian guide. Mr. Cleghorn, the agent of the company, kindly assisted me, and an Indian named Aleck promised to go, but demanded $1.50 per day. This price I was told was paid by the Geological Survey men, and, one native having received it, no other would work for a less sum. One Indian considers himself as good as another. Some of the men having lost their head nets and mosquito bars purchased others from the natives, and a camp was made for the night at the store.

The following morning, while waiting for a wind, Mr. Cleghorn informed me that the native hired the night before was sick, or claimed to be, but that he would secure me a better one, which he did. About 12 o'clock, however, the Indian he had secured said that he would not go unless Aleck was also taken. The cause of the trouble was the interference of other natives, who worked on the fear and prejudices of the men who had promised to go. Only one native was needed, but the situation changed so that neither would go unless both were taken. I had concluded to start as soon as dinner could be cooked, and while eating it Mr. Cleghorn said that the natives had once more concluded to go, but added that when I got ready, if I would tell him five minutes before starting, the natives would go. When ready to start I sent word and the natives came around and got into the boat.

Much difficulty was experienced in getting from the island on which the store stands to the first one above; from that point the boat crossed to the west side, but rocks were found at Rocky Point, so it became necessary to cross to the eastern side. After reaching the eastern bank it was necessary to tow the boat to the camping place for the night. A towline, made out of a small linen rope 300 feet long, was used for this work. About 3 miles was made on the 23d, but it was the hardest work any of the men had done while in Alaska. The day was hot, the current swift, and the river was full of driftwood. In addition, the mosquitoes were so bad that it was impossible for one to protect himself from them. Whenever possible, while ascending the river, camps were always made on sand bars in the center of the river, as it was found that there were

not so many mosquitoes away from the timber, and then, too, if there was any breeze blowing it was always in the center of the river.

The following morning a start was made, and on Monday evening about 6 o'clock the party arrived at Croto Creek, where a camp was made. Here a better boat for towing purposes was built, and the Columbia River sailboat abandoned. At the place marked on the map as the camp for June 26 we were delayed nearly thirty-six hours waiting for the wind to freshen up. The river was so swift—a 10-mile current—that it was impossible to either tow or row the boat upstream. The trouble with the sailboat was that it drew too much water—about 3 feet. This required us to keep in the main channel or swiftest current, instead of taking advantage of the sloughs, where the current was more sluggish. Frequently in towing this sailboat all hands took hold of the towline, and yet we were barely able to move it.

On June 25, while endeavoring to pass the towline around a partially submerged tree, Private Gamble fell into the river, which was very swift and deep at that point. Fortunately, when he came to the surface he managed to grasp a limb and pull himself out in time to avoid being carried under some swift drift near by. He had a close call for his life. The same evening some Indians going down the river to the station stopped at camp. When I learned that their home was well up toward the head waters of the Sushitna River I had them fed so as to get some information from them. I thought that they might be of some service farther up stream, as they said they were going back to their homes in the near future.

About 3 miles above the company store a large river flows into the Sushitna, and is called the Yentna (Yedno) by the Indians, and by some white men the "Johnson," in honor of the first white man to ascend it. Mr. Johnson was with the party, and from him I obtained the following information concerning it. He said that he had ascended it about 200 miles, and that there were two passes over the mountains from the head waters to the head waters of the Kuskokwim, which were used by the Kuskokwim Indians when they came to the Sushitna store to trade. The river is full of quicksand, quite rapid, and has several tributaries.

Croto Creek is a small stream of clear water flowing from the west, and of minor importance. About 6 miles up from its mouth the Sushitna Indians have a fishing village, used in the summer time. The vicinity of the stream is much frequented by them in the winter as a hunting ground. A few Indian cabins were noticed near the mouth of the creek. While busy building the boat at Croto Creek, Sergeant Yanert was sent under verbal orders to go up this creek as far as practicable, but with orders to return to camp not later than July 6, as it was thought the boat would be finished by that date. He left camp July 2 and returned on the 5th, having ascended the creek about 15 miles. The information he secured is noted on the map attached to the map of the Sushitna River.

While ascending the river the men used four shelter halves, which they buttoned together to form a complete closed tent. Then, by placing earth over the edges of it, mosquito netting over the top where the halves were buttoned, and driving the mosquitoes out, a fairly good night's rest could be obtained. Four men slept in each tent, but since there were no means of ventilating it the air became very close. If another party is ever sent into Alaska it should be well fitted out with mosquito netting and head nets made of cheese cloth. Mr. Johnson had a small tent the top of which was made of drilling, while the sides were made of cheese cloth, except about a foot around the bottom, where drilling was used, and on which earth was piled to keep the mosquitoes from working up underneath. While such a tent was very good for the purpose for which it was designed, it would not shed water and should therefore be remodeled to provide against rain. Such an arrangement is almost necessary for one traveling along the Sushitna River in the summer time.

When Mr. Johnson went up the Yentna River he and his partner built a flat-bottomed boat very wide and long, intended to draw the least amount of water and carry the necessary stores, and, as everyone familiar with towing up the rivers of Alaska recommended the same style of boat, it was decided to build a similar one for the use of my party. Early the following morning, a suitable tree having been found, which could furnish lumber sufficient to build a

boat 35 feet long and 5 feet wide on the bottom, all the men were put to work getting it out, floating it to the camp, and constructing a saw pit. From that time until the afternoon of the 7th everyone, except Sergeant Yanert for a few days, was kept busy on the boat, which was finally completed, and a start was made on the afternoon of the 7th. The boat was fitted up with a mast, so that if a good breeze sprung up at any time advantage could be taken of it. When loaded with all the stores the boat drew 7 inches of water, and when the eight men of the party were in it but 10 inches. It was found to be a great improvement over the sailboat, as it could be taken into shallow water, which was generally not as swift as the deep water, and then it towed very much easier than the sailboat. While at Croto Creek I purchased for myself a canoe, which was very useful at times for sending the Indian guide ahead to pick out a channel, and also to land at places difficult to get to with the large boat.

On June 29 one of the Indians was discharged, as he had proved himself unreliable, and it was ascertained that Stephan, the other Indian, would go with us. This Stephan proved himself a good man in many ways; thoroughly reliable when beyond the influence of the other Indians, and sober and clean. It was soon discovered that it would have been almost impossible to have made any progress with the sailboat in places, because of the swift current. After leaving Croto Creek, work was continued every day. We ascended the river occasionally by rowing or sailing, but at least nine-tenths of the way it was necessary to use the tow line, and usually with all the men on the line, except one to steer the boat and another to assist him in case the boat should get away from the men on the tow line. On Monday, July 11, Mr. Johnson stated to me that if I would let him take the canoe and guide for a few days he would rejoin me in four or five days and would then stay with me until about August 5. As none of the party could converse with the Indian, and as he stated he would not remain with me after Mr. Johnson left, I concluded to grant the request. The journey was continued up the river until July 17, when a Midnooski or Copper River Indian was met, and by means of a little Russian and signs, he told me that the Talkeetna River was a short distance ahead, and that some Americans were encamped at the mouth of it. Their camp was reached about noon, where a stop was made for dinner and to ascertain what knowledge they had of the country. They proved to be a party of miners who were going up the river on a prospecting trip and had never been in the country before. A mile beyond the miners' camp the mouth of the Talkeetna River was reached. One could see that it was not a slough of the Sushitna because, while the water was from a glacier stream, it was not as full of sand as the water in the stream up which we had been traveling. The forks of the Sushitna are easily recognized by the large flat, which looks as if several rivers united there, and also from the immense amount of driftwood piled up as far as the eye can see. However, before we left the miners' camp one of the men saw the signal left by Mr. Johnson and we knew then that we were right if we ascended the supposed Talkeetna River. (9a.) Only once after the guide left us did we go wrong, which was on July 15, when we started to go up a small stream. After rowing up it for a mile it left the main river, so that it was thought best to return and follow up the main channel, as the water was apparently glacial. Later in the season it was found to be a slough of the Sushitna and one that it took a party seven hours to go through. On the evening of July 18 the guide and Mr. Johnson rejoined us. A sketch of their trip is inclosed, with notes thereon giving information concerning the country.

The Talkeetna River was found to be much swifter than the Sushitna. The current of the latter, however, was found to increase in swiftness as one approached the mountains. On the 18th not more than 2 miles was made, though harder work was done than on any other day of the trip. On the 19th the party reached the mouth of the Chinaldna, a small clear-water stream flowing into the Talkeetna about 6 miles above the mouth of the latter. As this stream marked the beginning of the old Indian trail across the mountains to the upper waters of the Talkeetna, it was decided to make a permanent camp at this place or until additional instructions were received from Ladds Station. The following day was utilized in making a cache for the supplies, in removing the same from the boat and drying them out, as a good portion of the same had been damaged by water.

The sugar was more or less wet, and although an attempt was made to dry it, a good portion

dripped away in spite of all attempts to prevent it. The flour was wet for a couple of inches into the sack and had then caked, preventing the balance from spoiling. As the provisions were getting low, and it was not certain that any more would reach me, I decided to send part of the men back to Ladds Station. I selected those who had more or less experience on the water, and concluded to let them make the trip down the river on a raft. The raft was made on the 20th out of green spruce logs tied together with linchpins, securely lashed with plenty of manila rope, and made so strong that it was not thought possible for it to break up. At 1 o'clock p. m. July 21, Privates Bergen, Fels, and Matlock, Fourteenth Infantry, started down the river, carrying a letter to the commanding officer of the expedition, and another one to the agent of the trading company at the station, requesting him to furnish them with such provisions as they might need while at the store. They were directed to wait at Sushitna Station for a sailboat or launch and not to try to reach Ladds Station by rafting to the mouth of the river, from which point they would have to travel down the beach. The raft was upset or grounded three times on the way down and all of the rations, some of the bedding, and all of the tools except an auger were lost. Once it was caught on a tree 2 or 3 feet in diameter, and the only way they could get free was by boring it in two. They eventually reached the station in safety, and reported that if the raft had been constructed out of dry timber it would have drawn but very little water and would have been easily handled.

While ascending the river great difficulty was met with in trying to get around the numerous log jams found between the head of one island and the foot of the next. Generally the water was much swifter at the head of these islands, where, if a log jam existed, the water was much deeper. Frequently men would step into deep holes, and not a day passed that all of them did not get wet to the waist in the icy-cold water. The hip gum boots afforded some protection, but even with them it was impossible to prevent getting wet during the day. At first the men were much afraid of the quicksand, but it was soon found that at about 12 inches below the surface of the sand a bed of hard gravel was reached. After learning this they were not cautious enough. The first thing after stopping for the night's camp, two men would start a large fire, around which, later, all would gather and dry out the wet clothing and then prepare their beds. Many a night it would require three hours to dry out the woolen underclothing and socks. Everyone worked hard, and at times under the most trying circumstances. The mosquitoes, as stated before, were a great trial to all of us when we first entered the river, but as we went upstream more sand bars were found for camping places and they bothered us less and less, until about August 15, when they practically disappeared.

A few small black flies with white legs took the place of the mosquitoes and remained until frost came. These flies did not bite often, but when they did they were savage. One of the men had his eye closed by being bitten on the lid. The fly would crawl through mosquito netting, but cheese cloth had too fine a mesh.

July 22 was used in making packs and preparing rations for a trip away from camp. Sergeant Yanert was sent up the Chinaldna with Private Gamble with orders to map that stream as far as practicable and to try and ascertain what mineral wealth there was on it. The following day, as rain fell all of the forenoon, a start was not made until the afternoon, when Mr. Johnson, Private Gamble, Stephan, the Indian guide, and myself started over the old Indian trail to the head waters of the Talkeetna. All of us carried about 60 pounds, except the Indian who carried about 80, and then said that his load was too small. Owing to the late start, and owing to the fact that the guide lost the trail, only 5 miles were traveled that afternoon. The guide accounted for his losing the trail by saying that he had not been in the Talkeetna country for four years, and as all trace of the trail was covered up under a dense growth of vegetation the excuse was a reasonable one.

While camp was being made a heavy rain storm set in and continued until the next morning. The guide peeled off the bark from spruce trees and placed it on the ground to give a dry place for the blankets. The trail during the day led through a heavily timbered country, covered with a dense growth of moss, and there was more or less of a swamp most of the way. The following morning a start was not made until about 10 o'clock, in order to give the tents a chance to dry

out, and the bushes to shed some of the rain clinging to them until about that hour. As we had but one blanket apiece the night before, and as the tent would not shed water, a very disagreeable night was spent by all. The following day a camp was made on the first mountain at timber line, which was about 2,500 feet above sea level. During the day the trail continued through timber and swampy ground. For a mile it passed through a canyon along the marshy banks of a small stream to its head and, after crossing a narrow divide, descended 300 feet into the marshy valley of another small creek. While a pack trail could be made through the country traversed thus far, a considerable amount of work would have to be done in cutting out a trail and corduroying the marshes and swampy ground.

The next morning the guide pointed out a short cut to the head waters of the Chinaldna, and stated that Sergeant Yanert might not reach it because of canyons along the river, so it was decided to send Private Jones and Mr. Johnson through that way, while the guide and myself were to go on to the head waters of the Talkeetna. The trail led up the mountain above timber line to an elevation of 3,000 feet, when it descended into a valley just at the edge of the timber. The timber line is not at the same elevation throughout, but at times varies several hundred feet within a mile, depending on the direction of the slopes of the mountain side. After traveling 3 miles the guide saw a caribou on the mountain, a mile back. As we had not had any fresh meat since leaving Ladds Station, he went back, and soon returned with part of a small caribou, having given a portion of it to Private Jones, who had also seen the same animal. A heavy storm came up, so camp was made for the night. The following day the journey was resumed, and the trail, like the day before, was found to keep well up on the mountains, descending at times into a valley and then running up on the mountain side again. In each valley crossed we usually found a marsh which required work to make it passable for animals. Generally there was no timber near by for corduroying the same. Shortly before camping for the night the trail led across a canyon, the banks of which were so steep that it was doubtful if a pack animal could go across it with a load. In places we were glad to pull ourselves up by grasping bushes. On one side the bank is 300 feet above the bed of the stream flowing through the canyon, while the other bank is 600 feet high, and then slopes back, so that camp, which was made 1 mile from the canyon, on the divide, was 1,400 feet above the stream. Shortly after making camp the guide pointed out a smoke about a mile away, which we first thought might be from Lieutenant Castner's camp fire. The guide fired a rifle and soon smoke signals told him that the party at the camp consisted of a Midnooski man and two children, and that they would soon call on us. When these Indians arrived they said they were going to meet a Midnooski Indian who had gone to the station. One of them noticed a caribou on the mountain and, borrowing a gun, killed it and sent a fine piece of it to camp. That night a heavy rain storm set in and continued for three days. At this time the camp was at an elevation of 3,800 feet above sea level, and the clouds hung so low on the mountains the guide said that he could not travel because he could not see any landmarks. Our camp at this place was a very disagreeable one, as the tent leaked and there was no fuel to be had except a few green alder bushes. The fourth day the trip was resumed and a divide 4,000 feet high was crossed within a mile of camp. During the day two caribou were killed and such meat as could not be carried was cached for our use on the return trip. The guide said that the Indians living on the Talkeetna would send for it. Shortly before camping a divide 4,375 feet high was crossed, and then the trail descended for 1,000 feet. Camp was made on the mountain side about 10 o'clock, when it was so dark that one could not see to travel farther. The next morning the journey was resumed as soon as it was light enough to see. A stop was made for breakfast at the first place where there were enough bushes with which to cook the meal. The next camping place was on a small creek about 4 miles from the Midnooski village and about a mile from the Talkeetna. During the day the cord on the bottom of one of my feet was sprained, and in consequence it was necessary to make frequent stops. The descent was made into the valley of the Talkeetna from a mountain side 4,000 feet high, which was so steep that it was very difficult to descend, and which no pack animal could descend. The valley of the Talkeetna has an elevation of 2,100 feet.

Most of the views taken were ruined, owing to the constant rain which wet the camera, causing it to leak light, notwithstanding every effort possible was made to keep it dry.

Owing to the injury to my foot I thought that it would be best to leave our packs at the camp and walk to the Indian village and ascertain if any of the Indians had seen or heard of Lieutenant Castner and party. Upon our arrival at the village it was found to contain 3 men, 7 women, and about 20 children. But one man was in camp. He played the part of host, offering me some tea, which the guide had brought with him. Stephan wanted to stay for a while, and after a time he told me that the Midnooskis had not heard or seen anything of Lieutenant Castner's party. When evening arrived, Stephan, the guide, would not leave, and as I could not find my way to camp I was compelled to stay at the village overnight. The following morning we arrived at our camp about 7 o'clock. As my foot was so bad in the morning I concluded not to try to go farther, especially as one of the Midnooskies promised to pilot me to Wasili's house, upon my return, which, as near as could be ascertained, was about 20 miles above their village on the Talkeetna. The return journey to the camp on the Chinaldna was accomplished without incident worthy of note, except that the rations ran very low, and that a party of 5 white men, miners, were met about 25 miles from the camp. These men were bound for the Upper Talkeetna and had as their guide one of the Midnooski Indians. They said that they left a white woman at their camp, which was near mine. Because of the heavy rains they were afraid the river would rise, and requested, if such was the case, that I take steps to assist her. During my absence of fourteen days from camp, rain fell the greater part of every day but one. The packs, in spite of all precautions, would get wet and the rations would spoil. Most of the sugar dripped away and some of the flour was ruined by the rain. The weight of the packs was greatly increased by getting wet. Matches were kept dry, in a measure, by putting them in the center of the bedding and then drying them out each night at the camp fire.

When we arrived at camp the Chinaldna was flooded. Steward Neville reported that he had moved the supplies once and that it would have to be done again. Early the next morning, as the stream was still rising, every one got into the boat and proceeded across the stream, placed all the property belonging to the lady's party in her boat and secured it behind a log jam. Then we returned across the stream, and brought the lady and such articles as she needed. When the camp was reached it was necessary to move it, as the ground on which it was located was nearly flooded. The new camp was pitched on a bank which was considered safe, but the following morning it was again removed to the top of a bluff about 60 feet above the river. Besides the Government property the stores belonging to two parties of miners were moved. About the time the property was secured, shots and calls were heard on the opposite bank of the Chinaldna and soon two white men were seen. As soon as practicable the boat was taken across and the men brought back. They proved to be members of the party of miners seen on the trail, and came back because they were suffering with rheumatism. They were out of provisions, and as their matches had gotten wet were in a bad fix if they could not reach our camp. About dusk, the three Indians who stopped at the camp one night on the Sushitna came up and stated that they were going to the Tanana in a few days, where they intended stopping for five days, after which they would return to the station on the Sushitna.

Upon arrival at the camp a letter was handed to me from the commanding officer of the expedition, which informed me of changes in the original plans and directed me as to future movements of the party under my charge. Desiring to act as it was thought the commanding officer would, under the circumstances, I resolved to send Sergeant Yanert with Private Jones in the direction of the Tanana, employing one of the Indians to act as guide. The Indians drew several maps of the country and said that it would take fifteen days to go and about twelve to return, as on the return trip a raft could be made and used at the crossing of the Sushitna. They also stated that the country was inhabited by moose, caribou, bear, ptarmigan, and mountain sheep. They were unable to show the place on our Government maps at which the Tanana would be struck on their trail, but they described a rapids on the river and drew maps of them which tended to convince us that it would be at the mouth of the Delta River.

Two of these Indians left camp on August 11, and were followed by Sergeant Yanert, Private Jones, and the remaining Indian the following day. Each member of the party carried about 70 pounds. Before he left, Sergeant Yanert reported that upon his first trip up the Chinaldna River he was stopped at the forks (shown on the map as the place where work on that stream ceased) by the high water resulting from the continual rain, which compelled me to remain in one camp for three days. He was joined at that place by Mr. Johnson and Private Jones, and all thought that it was best to return to camp when the rain stopped to get a fresh supply of rations. Upon arrival there Mr. Johnson returned to the station with the Indians, who brought the mail, and as soon as the weather cleared so that traveling could be resumed, Sergeant Yanert and Private Gamble returned to the forks of the Chinaldna to complete some work there and did not return to camp until August 9. After one day's rest the Sergeant started for the Tanana River. More time would have been given him if it were not for the Indians, who had stayed in camp two days beyond the time they intended. They agreed to pilot the party through and back for $20. Sergeant Yanert was furnished with $50 in cash and a private check sufficient to pay his fare from Weare to St. Michael, providing he succeeded in getting through to the Tanana and was unable to return, in which case he was to report to the commanding officer. A letter was sent to the commanding officer with a request that he furnish the Sergeant and Private Jones with transportation to Seattle.

On August 13 I started with Private Gamble for the Upper Talkeetna River to meet Sergeant Mathy's party coming with the pack animals. About 60 pounds was carried in a pack on the back of each of us, and consisted of rations, except two blankets and a few necessary toilet articles. The trail followed was the same as the Indian and I had followed a few days before. Nothing of note happened on the trip until the 23d, a very stormy day, when, being desirous of making as much progress as possible, I did not stop, thinking that I could find my way, although all the landmarks were shut out from view by the clouds. In a short time we were lost, but after proceeding for some time we came to a gap that was recognized, and going through it, camp was made for the night. The following day, as the fog still hung low on the mountain, no start was made, as that part of the trail could not be traversed except on a clear day. Until after I had learned by experience I did not believe the guide was telling the truth about his inability to travel on the former trip when the fogs obscured the mountains. About evening some miners came to the camp and reported that they had lost the trail the day before because of the fogs, and strongly advised me not to travel while the clouds and fogs concealed all landmarks.

This party of miners was the one met on the return trip before, and when questioned said that they succeeded in getting to Wasili's house, and that they left a note there, as requested by me, addressed to Lieutenant Castner, telling him to come to the Midnooskies village and, in case I was not there, to secure a guide and come to the camp on the Chinaldna. (10, 11, and 12*a*.) They stated that Wasili's cabin was about 20 miles above the Midnooskies village, on the Talkeetna River, and that the trail going there did not follow the river, but led up the mountains and through a comparatively low pass. The principal difficulty in the way would be the crossing of two canyons, and when asked if animals could get through they said that they could if they could get by the canyons, which was considered doubtful. They described the country beyond, as far as they could see it, as being an open, grassy, and somewhat marshy country, and more or less intersected by canyons which would offer the most serious obstacles to a pack-train trail. These men were nearly used up, and stated that they had had a very hard trip because of the incessant rain.

On the eighth day from camp the former Midnooski village was met. To my surprise there were no Indians there, although the party of miners left the Indians there and reported that they agreed to take me through to Wasili's cabin. The packs were left at the fishing village, and we proceeded to follow their trail, which in about a mile from there brought us to the Indians' winter cabins. From every sign found there we thought that the Indians had left a very short time before we arrived. After searching a short time their trail was found and followed for a mile, and as it was very fresh and distinct I hoped that by climbing a high hill their camp

would be seen, but once more we were disappointed, as no smoke or camp could be discovered. We returned to the fishing village and made camp for the night. The following day, Sunday, as both of us were suffering from rheumatism and as a heavy rain fell all day, camp was not moved until Monday, when we followed the Indian trail which led up the stream toward the Middle Fork of the Sushitna River. After following the trail for about 8 miles it led into a stream, and could not be found again. As soon as I was satisfied that it would be impossible to find the Indian village I struck out for the mountains along the Talkeetna in the direction indicated by the miners. Camp was made for the night at the edge of timber line, and the following morning Private Gamble, who had been suffering for some time with the rheumatism, was unable to go farther. He was left at camp, and I started out to climb a high, sawtooth mountain, some 4 miles away, in the direction of Wasili's cabin, hoping thereby to see some signs of Sergeant Mathy's camp, or perhaps of the Indian village. Unfortunately the clouds hung so low on the mountains that it was impossible to see any distance, and it was useless to climb the peak.

Before turning back I came to a large gap in the mountains, which led into a valley that extended for several miles in a direction slightly south of east. As far as I could see, it had a high mountain at the end of it, but it may have turned slightly to the south and have extended many more miles than was seen by me. If it had been a clear day I believe that I might have seen some signs of Sergeant Mathy's party, for, after conversing with them upon my return, I am quite certain that we were not over 20 miles apart on that day. If I had known, definitely, that they were no farther away than that I could have reached their camp, but as our provisions were nearly exhausted and one of the party was suffering with the rheumatism it was thought best to turn back. The return trip was commenced on Wednesday, the 24th of August, after we had eaten the last bit of provisions in our possession. As there were some provisions cached about 14 miles back on our trail we would have to go that far, unless we found that the Indians had returned. In this event I had some hopes of getting some provisions from them, and perhaps a guide, when I would then proceed to Wasili's cabin. Upon arrival at the village the Indians were not found there, so after leaving a sketch of the route to the camp, and very extended directions to Sergeant Mathys as to the trail, we proceeded on to the cache.

I was much disappointed to fail the second time to get through to Wasili's cabin. If the Indian guide, who had promised to pilot me through had been at the village, as he had agreed, there would have been no trouble in getting through and several miles farther, perhaps to the head of the stream. The time lost at the village and in hunting up the Indian camp from Saturday until late Monday afternoon was more than would have been required to make the trip to Wasili's cabin.

After spending a night at the cache a start was made for the camp on the Chinaldna River, about half past 5 in the morning, and camp was made for the night at 8 o'clock, after traveling 25 miles. Private Gamble suffered a great deal during the day, and I was afraid at one time that he would not be able to make the camp. The last 20 miles was above timber line, and the day being quite clear it was necessary to make that distance before the clouds settled down and obscured the landscape, as well as to get fuel for camp. We were without food for sixteen hours, and when it was cooked the bread was made out of wet, moldy flour, the lumps of which had to be mashed before making bread. During the greater portion of the trip we were on short rations, and the food eaten was such as would not have been used if good articles of ration could have been obtained.

The following morning, as it was raining hard and no one woke up until it was too late to make the main camp that day, it was thought best to remain quiet. There was no necessity for getting wet two days in succession. If we started early the next day we would be able to reach camp before night. The following morning the trip was resumed, and the day proved to be the second one out of fifteen days we traveled that it did not rain. Camp was reached early in the afternoon of August 27, after a tramp of 20 miles. When we arrived I was informed that no news had been received from below, and that Stephan had not returned with the provisions, so that to remain until the 15th of September to await the return of Sergeant Yanert would be a very difficult thing unless we could secure provisions from the miners, or else live on flour, as all

our other provisions were exhausted. Shortly after arrival at camp, in a conversation with the miners who reached Wasili's cabin, I learned that I was on the right trail and was about halfway to the place of destination.

From the mountains along the tributary of the Talkeetna, on which the Indian village was located, an extended view could be obtained up the valley of the tributary. The valley varies in width from 1 to 10 miles, and was well timbered and full of small lakes. The trail followed, when looking for the Indians, was fairly good, well worn, and one over which pack animals could be taken without difficulty as far as we traveled it. On the first trip to the Indian village they informed me that it was three sleeps to the middle fork of the Sushitna at the bend. The bend referred to could be seen from the mountains, and was very sharp. Mountains were seen rising from the north bank of the river, while on the south side the country looked as if it was comparatively flat. As far as seen, all of the country south of the Talkeetna River was very broken. One jagged and rocky mountain peak rose after another, but none exceeded 6,000 feet in elevation, while the usual elevation was somewhere near 4,500.

The difference of elevation between the Talkeetna River at the mouth of the Chinaldna River and at the Indian village about 50 miles away, is approximately 1,200 feet, giving a fall of over 20 feet to the mile. I could not learn if there were falls on the stream, but when questioned the Indians said that it was not good for a boat, and stated that it was full of stones and that there was a big canyon on the stream. They said that in the winter time they traveled up and down the river, so it would seem as if there were no falls, but probable rapids, and a very swift current most of the way.

From the Indian village to Wasili's cabin the Indians sometimes use canoes in going up the river, but generally they make a portage because of the swift current. From the time of our return to camp until Sergeant Yanert's arrival, nothing of importance was done, as it rained nearly every day and I did not feel like taking the men out, as their footwear was worn out and none could be secured for them. A trip was made to the coal vein, and the information secured will be duly noted hereafter.

A fairly good trail has been made from the mouth of the creek to the claims. As far as we traveled the banks are heavily timbered with a fair growth of spruce and some cottonwood and birch.

During the fore part of the month Private Gamble was laid up with a severe attack of rheumatism. For some unaccountable reason I have been informed that all the medicine for that disease was taken out of the medicine chest before it was taken up to Alaska. More people were bothered by the rheumatism during the summer than by all other ailments combined, and if any more work is done in Alaska plenty of medicine for that disease should be provided by the medical department.

Owing to heavy rains on the upper Talkeetna River it overflowed its banks on September 4, causing the water to back up in the Chinaldna, until at its mouth it was higher than we had previously seen it. During the month of September the weather became colder, until on the 9th ice half an inch thick formed during the night. While the river was flooded, every now and then, trees would be undermined and fall into the river with a report sounding like the firing of cannon.

On the morning of September 14 Sergeant Yanert and Private Jones arrived at camp after a very hard trip. They stated that they did not succeed in getting to the Tanana River, but, as near as they could judge from what the Indians said, they were about 35 miles from it. The sergeant reported to me that once while fording a stream he was washed down it, and came near being washed into a canyon. At another time the sergeant had one of his shoes washed away, after which he resorted first to moccasins, being finally compelled to cut up his shelter half for footwear. With no other protection he traveled a great many miles, and when he arrived at camp he had used up all his canvas and had nothing to lie on or put over himself while sleeping. Both are very deserving men, meriting reward for their hard and faithful work. They ran out of provisions, and took about 30 pounds of flour from a cache made by the geological party under charge of Mr. Eldridge, who, when seen later, said he was glad the flour was used, as his party did not need it.

During the time we were encamped on the Chinaldna River, from July 19 until September 15, there were but six days in which rain did not fall, and most of the time it rained the greater portion of the twenty-four hours

On the morning of the 15th of September camp was struck, and the party, with four miners and the lady we met on the Chinaldna, started down the river for Tyoonok. The mouth of the Talkeetna River, 6 miles below camp, was reached in an hour without any rowing, except enough to give steerage way. At the mouth of this river, owing to a misunderstanding between the men handling the oars, the boat came near being swamped on a log jam. As it could not be avoided, the boat was steered straight for the jam. When it struck it slid up about 3 feet on the first log, and was promptly pushed off by the man in the bow, so that no damage resulted to it.

At the mouth of the river some provisions were secured from the mining party, some of whose members were going down the river in the boat. The provisions were to be replaced by feeding those with us until a steamer for the States should call at Tyoonok, an agreement that was advantageous to all. The same party had furnished us with provisions before under the same agreement.

A cooking stove was set up on the boat. No stop was made for meals, but about 3 o'clock camp was made because of a heavy rainstorm. At this place we met Stephan, our former guide, who was bound for the head waters of the first southern tributary of the Talkeetna River on a mining trip. He stated that he tried to get back to the camp, but was taken sick, and when he got well the river was so flooded that he could not get up. He also said that the island on which the Sushitna store stood, was flooded and some of the buildings were nearly washed away. While in camp a party of miners arrived and stated that they had been forty-five days getting this distance from the store, about 40 miles distant. They seemed satisfied with their rate of progress, stating that some days they made as much as 3 miles a day, while other days they did not do as well, making sometimes less than half a mile a day. Their boats were not suitable, as one drew 3 feet of water and the other about 14 inches. This party was bound for the Tanana River, intending to sled their goods up as soon as the river froze over.

The following day, owing to a heavy fog which made it too dangerous to proceed, the trip was not resumed until late in the forenoon. On the way down a rainstorm set in and continued until we arrived at the station, where we made camp for the night. About 10 miles above the station, while following one of the main channels of the river, it suddenly split up into a number of streams. Choosing the swiftest, and suddenly rounding a point, the man in the bow called out that there was a tree across the channel. When seen, it was too late to avoid it, and as it reached clear across an effort was made to run the boat over that part of the tree which was entirely submerged. When about half over the boat stuck fast, as the water was only about 4 inches deep over the tree. Saws were gotten out, and when nearly sawed in two the tree was sprung down and the boat released, but not until it had been badly "hogged."

While at the station the lady with the party had a bad attack of heart trouble, but after the steward had worked over her for two hours she was better, and declared the next morning she was able to proceed. While at the station evidences of the flood could be plainly seen all over the island. Some buildings were partly undermined and nearly ready to topple over into the river. Mr. Cleghorn, who had spent six years at the station, stated that the past season was the worst for rain that he had seen there, and that because of the flood he would be compelled to move the station to the east bank of the river on high ground. He also verified the statements of the Indian guide, relieving him of blame for his failure to return to camp with the provisions so badly needed.

The first view shown is Sushitna Station, the only station on the Sushitna. The second one is a typical one of a bluff on the Sushitna River, showing in the foreground a few of the numerous channels of the river.

On September 17 the trip was continued down the river, and the sea was reached before the tide had begun to ebb, so that a stop was necessary, the intervening time being spent in hunting. On the way down some member of the party called out that he saw a canoe coming up the river; another said that there were two Indians in it; another still replied that the canoe was coming

up faster than the boat was going down. It proved to be a moose, which escaped before a shot could be fired. About 4 o'clock, thinking that the tide was about to turn, a start was made for the Beluga River. As soon as the boat was away from land it was discovered that the tide was still coming in, so resort was had to the oars, as a camping place on the Beluga must be reached before dark, since no other suitable camping place could be found.

When the tide turned a wind commenced to blow out of Turnagain Arm. It was all the party could do to make any headway, even with the tide. Darkness coming on and the sea continuing to increase, the waves breaking at times into the boat, it was decided to run upon the mud flats and stay there until morning; not a very cheerful prospect without a fire and with a sick woman on board. Just as the boat was nearly beached a stream was seen. Heading into it, we were soon in quiet water, but after proceeding up the supposed stream half a mile it was found to be a tide slough in which fuel could be obtained. Under the circumstances it was decidedly preferable to spending the night in the boat. The ground everywhere was a salt marsh, making it impossible to lie down, except on the boat, where a bed was fixed for the woman, everyone else sitting up beside the fire. All night long the cry of water fowl could be heard around the camp, and the following morning several were killed while waiting for the tide to turn.

The mud flats along the head of Cook Inlet are much dreaded by many, but it would seem they are a blessing in disguise, for all one has to do if caught in a storm, is to run the boat on them and wait a change in the weather. If the shore had been rocky, and one on which a landing could not have been made the night we were camped in the tide slough, the lives of all the party might have been lost. At 6 o'clock the tide commenced to ebb and a start was made. Ladds Station was reached about 10 o'clock, where it was ascertained that the permanent camp had been moved to Tyoonok two hours before. Resuming the journey, the trip was made to the new camp shortly before the tide commenced to flood.

Nothing of interest happened at Tyoonok until the arrival of the remainder of the expedition under Captain Glenn, Twenty-fifth Infantry, on the evening of September 30, 1898.

Mr. Jack, who ascended the middle fork of the Sushitna River in 1897 to its headwaters, furnished me with a copy of the map his party made of that stream, and a summary of his diary. As far as could be learned, his party is the only one that has ever ascended that stream above the canyon. According to the latest reports at Sunrise City, a pack train trail has been cut from that place to the foot of Lake Kenai, and from the head of Lake Kenai a wagon road has been constructed to the head of Resurrection Bay. Lake Kenai can be navigated by good-sized boats, if there is ever business enough to warrant such on the lake. The trail, as previously stated in the report, was very bad at the time the party traversed it, and some parts of it can never be made good without the outlay of large sums of money.

From what could be learned from others and our own experience on the Sushitna River it would seem as if a flat-bottomed steamer of not over 2 feet draft when loaded could be constructed to ascend the river as far as Indian Creek, noted on Sergeant Yanert's map. The steamer would require a large amount of power to make headway against the strong current, which averages about 5 miles per hour and much more when the river is flooded. On the way down the river the steersman, a miner who has navigated the upper Ohio, stated that a steamer could be constructed so as to navigate the Sushitna, and Mr. Jack, who has been up the river twice, agrees with the statement. Some difficulty would be met with in finding the channel, which is shifting constantly, and in locating it where the river divides into many channels. If gold is ever found along the Sushitna River in paying quantities I feel sure that a steamer would be put on the river to run probably as far as Indian Creek, about 40 miles above the mouth. The agent of the Alaska Commercial Company stated that his company would probably build a steamer to run from Tyoonok to some point on the river whenever there seemed enough business to warrant it.

Greater difficulty would be encountered in descending the river in a steamer than in ascending it, because of the swift current, which would make it very difficult to steer a boat. The turns in the river are very short at times, and there are so many channels that a quick-steering boat would be necessary to avoid running ashore and upon log jams. During the winter the Tanana Indians travel to the Sushitna store to trade, and are said to make the trip in thirteen days, using dog

teams, by which means they often travel from 35 to 40 miles a day, according to reports. The route followed by them is up the Sushitna on the ice to the forks, and then up the Chulitna across the divide to the tributary of the Tanana that Sergeant Yanert has mapped. This would seem to afford a very feasible route to the Tanana and Yukon in winter time, providing one is on the Sushitna River or at Tyoonok, as he can very readily reach the Sushitna from the latter place any time of the year. The ice that is said to form in Cook's Inlet prevents steamers from going to Tyoonok a large portion of the winter, while the reported storms of the summer seem to deter some vessels from ascending the inlet as far as Tyoonok.

The trail across the country to the upper Talkeetna River is, perhaps, the best that can be found, but it is a poor one for pack animals, although they could be got over it. From the Indian village pack animals could be taken up to the middle fork of the Sushitna River over the Indian trail there, and, as far as could be seen, without great difficulty. To take pack animals from the Midnooski Indian village to Wasili's cabin and from there to the Chicaloon is problematical, according to the information obtainable, because of the canyons that have to be crossed.

A pack-train trail could be constructed up the Sushitna River; but, as the valley is very heavily timbered and there is so much low ground covered with thick moss, it is doubtful if it would ever pay. For a small amount of business it would be cheaper to tow supplies up the river, as was done last season, and for a large amount of business a steamer would be more economical.

While a railroad could be constructed from Resurrection Bay to Sunrise, it is very doubtful if there would ever be business sufficient to warrant such an enterprise, and then, again, the snow slides would make it a dangerous route in places during a portion of the winter season. A railroad could be built up the valley of the Sushitna River without any great difficulty, and from there to the Tanana by way of the Chulitna or West Fork of the Sushitna River. The highest point to cross would be only 2,700 feet above sea level, and that would not be reached until a distance of 200 miles from the seashore had been covered. All of the timber needed for ties, etc., could be obtained along the route, except near the summit. An abundance of gravel for grading is found along the river and plenty of coal of an inferior quality. At times bluffs from 30 to 200 feet high rise straight up from the edge of the water. They would present no serious obstacle if quartz, in paying quantities sufficient to warrant the construction of a road, is ever found along the head waters of the Sushitna River, or the lower part of the Tanana River. One drawback to a railroad in the valley of the Sushitna would be the deep snows of the winter. When the Indians were questioned about the amount of snow they replied by raising their hands as high as their shoulders, and white men said that there was generally about 5 or 6 feet of snow on the level. This is far different from the amount that falls in the Tanana, according to the Indians, who said that there was only about 18 inches on the level and that it was very cold there.

No especially available or suitable sites were noticed for military posts, but if the country develops so that troops are needed in the Sushitna, and a trail is ever made to the Tanana by way of the Sushitna River, an available site could be found in the vicinity of the forks. That location would be a central point, and in conjunction with a post on the Tanana would command all of the surrounding country. Many healthful sites can be found on the bluffs along the river, and when necessity for their location arises a command going into the country can readily select proper sites, having due regard to the conditions existing at the time.

THE ALASKAN INDIAN.

The Coast Indians all bear a strong resemblance to the Japanese and Chinese, being small of stature and having the prominent cheek bone of the Chinese. The resemblance is so strong that it is observed and commented upon by many. Each village contains only a few inhabitants, generally under 50 souls, except Tyoonok and perhaps Sushitna Station, which have more. Each village usually has a different dialect. Sometimes the natives of one village are scarcely able to understand those of another. Along the coast most of the natives understand the Russian language, and that is the principal medium of communication between the different villages. The Indians of the interior do not understand the Russian language, so that it is very hard to

communicate with the various tribes that one meets while traveling in Alaska. These Indians communicate by means of smoke signals with each other, even though they belong to different tribes. While they have a sign language, they do not use it as much as the Indians of the United States.

The Indians in the interior are far superior physically to those seen along the coast, resembling the best type of Indians found in the United States. Along the coast the Indians are deformed, dwarfed, and more or less diseased. They have been for years under the domination of the Russians, prior to the transfer of Alaska to the United States, and in consequence have adopted the ways of white men to a greater or less extent. In dress they wear the same style of clothing that the white men do. For footwear they use a tabersos made of the hide of a moose or caribou tanned by them. The tabersos is not waterproof, but it has the advantage of letting the water run out when once it has soaked through, which the American shoe will not do. In religion the Coast Indians are followers of the Russian Church, likewise those of the interior, where they have come in contact with the Russians, and they profess the same religion, or rather forms and ceremonies, without knowing the meaning of the same.

On the coast the natives are not polygamists, but those in the interior, along the Talkeetna, called the Midnooski or Copper River Indians, have as many wives as they can get. In the summer time tents are used for protection, but nearly all have log houses to live in during the winter, although some use nothing but tents during the entire year. The houses have a large opening in the top for the escape of the smoke, and generally have but one or two rooms, which are occupied by as many as can get into them. When the salmon start to run, the natives move to some good stream and put up the winter's supply of dried salmon, or "eucla."

All seem to have a good idea of distance, which is expressed in so many sleeps, and also a fair idea of the geography of the country as regards important features. They are the best of hunters and can see and locate game when a white man would not think there was any in the vicinity. All of their villages are well supplied with dogs, which are used as beasts of burden in the winter to pull sleds, and are sometimes used as pack animals in the summer. Birch bark or skin canoes are generally used on the rivers. It is stated that an Indian will not kill a dog, but when one becomes too old to pick up its living it is taken to some place, such as an island, from which it can not get away, and there left until it starves to death. While the dog is not an object of reverence, yet the Indian will not kill or eat one of them.

The natives are very strong and make fine packers, carrying at times over a hundred pounds. A girl about 12 years old carried 60 pounds for 16 miles one day, the greater portion of the distance over a mountain trail very rugged and rough. The women do the larger portion of the work around camp, while the men hunt and travel up and down the rivers. When game is once killed, the hunter usually remains near it until it is all eaten, when he goes on in search of more. The Sushitna Indians with the party were very clean, having their soap, towels, and toothbrushes, and using them frequently. All natives are very fond of drinking tea, using only the black when it can be obtained, and to secure it they will sell or trade any of their possessions. The Indians in the Cook Inlet district were not addicted to the use of intoxicating liquors. When questioned about their use, some said that it was "no good," and described the effects very vividly.

The natives are rapidly disappearing, dying generally from pulmonary troubles, while all of them are more or less troubled with rheumatism. In a few years, around Cook Inlet at least, there will be very few left. Villages have decreased 50 per cent in five years, so we were informed. If the Indian was taught to raise vegetables and take care of himself, his lot could be greatly improved, but to do this a certain amount of power would have to be conferred upon some one to make him do as told. They are very superstitious, and as an instance the following is quoted: Last winter an old native failing to return at the proper time, a search was made for him and he was found nearly dead, with a great many bones broken. When asked how he came to be injured, he said that he had met the "big man," who proceeded to kill him and left him for dead. The Indian describes the "big man" by saying that the distance between the big man's thumb and finger was greater than the height of the tallest tree. The old Indian lived about two weeks and then died. He did more to fasten the belief of the "big man" upon the Indians

than the white men can do in years to come to raise them above such a superstition. It seems that the Indians believe that the so-called "big man" lives in the woods and roams the same, hunting for Indians, and will kill every one that is found alone. In consequence of this belief no native will travel alone when he can avoid it. The native guide of the party would not go into the woods alone, and was afraid to have his tent pitched away from the tents of the other members of the party. When a native is questioned about the "big man" he endeavors to avoid the subject; if he can not do so, he will not talk about him more than is necessary.

According to the custom of the natives, a son inherits from his father, receiving a certain portion of his father's hunting grounds, generally the territory drained by some stream. If any other native kills game on this ground he pays the owner a certain amount, usually a quarter of the game. This manner of transferring hunting ground is said to account for different portions of the same river having different names; such, for instance, as the Talkeetna, which, according to the natives, has three different names, limited by the junction of tributaries. The Indian depends for food upon salmon, a large number of which is caught and dried. He also hunts, picks berries, cures and sells furs and skins, taking provisions in trade, while some of the coast Indians raise a few potatoes and other vegetables. (13 and 14a.)

According to my experience, the native is unreliable, shiftless, lazy, and generally worthless; more like a child than a man; promising to-day to do a thing to-morrow and then doing the opposite when to-morrow comes. As the white man encroaches on his game preserves, which is now certain because of the gold excitement, the Indian's principal means of support will decrease, and his condition, because of his shiftless and lazy habits, will become more and more deplorable, so that either the United States Government will have to take care of him or he will die from starvation. If an agent was put in charge of the Indians and they were compelled to raise such agricultural products as are suitable to the country, and also forced to catch and cure an abundance of fish, made to work whenever possible, and to spend the money received by them in a proper way, their condition would be greatly improved. They are docile and comparatively easy to handle, having a wholesome fear of the white man implanted in them through the dealings of their fathers with the Russian Government and its agents.

When a native desires a wife, if he is a coast Indian, he applies to the Russian priest, who marries him to the first Indian woman seen, no matter whether or not the parties care for each other. The Russians are responsible, to a certain extent, for the diseased condition of the Indian, as they introduced the Russian bath. A large room with one small opening is provided, and this is heated as hot as a naked person can stand. After remaining there some time in this overheated condition, the naked native rushes out into a snow bath, after which he is on the high road to consumption, or some other pulmonary disease, of which all natives show symptoms. The other causes of disease among them are the constant exposure to wet and cold, insufficient clothing and food, and their dirty and unsanitary habits.

A few years ago the agent of the Alaska Trading Company wished to spend the winter in California, and having no one to leave in charge of the store, he chose in that capacity the chief of the Sushitna Indians. Upon his return the following summer he found everything in proper shape, and a fine lot of furs that the chief had secured in trade from other natives. When the company, a few years ago, stopped all credit for the natives and they were nearly in a starving condition, the same chief referred to bought a sufficient amount of provisions to carry the entire Indian village through the winter. It was reported that he had about $2,000 saved. He is very friendly with the white men, and from all accounts is an exceptional Indian.

MINERAL RESOURCES.

No signs of coal were seen in the Kenai country, but upon arriving at Ladds Station many specimens of a brown lignite coal could be picked up on the beach. It is thought that all of that coal came from veins along Cook Inlet, in various places, and that the pieces are scattered along the beach by the tide. The natives and miners pick up such coal as is needed for fuel after each tide, which always brings a new supply. As the party under my charge proceeded up the Sushitna River, specimens of coal were found on the sand bars from time to time, but more plenti-

fully as the forks were approached. On the way down the river an outcropping of coal was seen on the east bank of the Sushitna River, about 2 miles south of the fork. The vein could not be measured, but as near as could be determined it was about 6 feet thick and of a poor quality.

Upon entering the Talkeetna River, coal was seen on the bars and banks, and the same coal was found in the Chinaldna River. It was the main fuel used at the camp on the Chinaldna River for about two months. The coal found there was a brown lignite of about the same grade as the best found in the vicinity of Tyoonok. The vein was located first by Sergeant Yanert, and is noted on his map. It is about 6 miles above the mouth of the Chinaldna, at the base of a cut gravel bank about 100 feet high. When seen by Sergeant Yanert the water was clear and the vein could be traced across the river to the east bank. When I visited the vein the river was flooded, and therefore very muddy. As near as could be determined by me the vein was 6 feet out of and fully as much more under the water, making it 12 feet thick. Private Gamble, who had seen it in clear water, said it was at least 15 feet thick, and perhaps much more, as it extended across the river, forming its bed, and there was no way of determining the thickness of that part forming the bed of the river. The vein is only slightly tilted and comparatively easy to work if occasion should ever render it valuable. Questions were asked the Indians as to the location of coal veins on the Talkeetna River. They all said they did not know of any, but did know of the location of the vein on the Chinaldna River. Mr. Johnson said that he did not see any sign of coal on the Talkeetna or its tributary, which he descended, and it is probable that all the float coal on the Talkeetna comes from the veins on the Chinaldna River. All of the coal found, when consumed, gave a fair amount of heat, but left a large amount of ashes. It might be that if quartz rock in paying quantities and grade was found in the country the coal veins would become very important.

The above pictures show a part of the coal vein in the Chinaldna River. It is impossible to show the greater part of it, as the outcropping of the vein is at the base of a high gravel bluff, and to take the pictures shown it was necessary to stand on part of the coal vein, the greater portion of which was under water. Sergeant Yanert reported that he found another large coal vein on the Sushitna River of about the same grade as the Tyoonok coal. It is doubtful if the coal found will ever have any value except such as it possesses for fuel in the vicinity, and even that will be small because of the timber found in the same localities. Enough was ascertained to show that there is plenty of coal of an inferior grade along the Sushitna River.

The first traces of gold found on the trip were near the foot of Lake Kenai, where fine colors could be obtained by washing out the dirt in a gold pan. At the foot of the lake on Juno Creek a large hydraulic plant was being erected to wash out the gold from large gravel bluffs near the mouth of the stream. Mining was also carried on along Copper Creek, but as this district was new and was just being developed, nothing definite could be learned as to its richness.

At the junction of Mills and Canyon creeks, mining was being extensively carried on and had been for some time. All of Canyon and Six Mile creeks and most of their tributaries are staked out and worked. Ten miles south of Sunrise City, at Hope, mining is in operation on Bear and Resurrection creeks, while across Turnagain Arm several creeks were being worked and others were being prospected. No definite information could be obtained about the amount of gold that was taken out of the Turnagain Arm district in 1897, but all stated that the amount secured the past season was less than the year before. More miners were in the district in 1898 than in 1897. Some new creeks were discovered and more gold should have been mined, and probably would have been, had it not been for the high water which washed out the dams and sluice boxes. Gold has been taken out of the Sunrise mining district for several years, but I was unable to ascertain the amount. Along the Sushitna River fine colors could be obtained from many of the bars, but while I was on the river I did not hear of a single discovery that was certain to prove rich enough to work, although good prospects were found on the Chinaldna. Miners claimed to get from 6 to 9 cents to the pan on rim rock on the Chinaldna River, 6 miles above its mouth, but no one succeeded in getting to bed rock the past season. Good prospects were obtained on the stream farther up, but nothing definite could be learned as to the richness of the Chinaldna. An old miner told me that it was the most promising stream, judging from

surface indications, and from the few pans of dirt he had washed out near its mouth, that he had seen in Alaska.

Late in October, before returning to the States, wonderful stories were told about the wealth of this river, but it is very doubtful if any accurate information could be obtained from the amount of work done on the stream the past season. No white man, except perhaps Russians, had ever visited the stream until the miners arrived there early in July. So all information about its wealth is derived from the past season's work. Stories were told by one man that he obtained 50 cents to the pan, and in another place, that, from dirt secured under a bowlder on rim rock, he obtained $1 to the pan.

While such stories may be true, yet with the small amount of work done no one can tell anything about the wealth of the stream. One small nugget, worth 56 cents, was found one-half mile above the coal vein on the creek, and the people who have the claim from which it was taken are so well satisfied that they stated they were going to put in another season's work on the Chinaldna.

The Chinaldna River is a clear water stream, very rapid, about 30 yards wide and 45 miles long with several tributaries, and would be very difficult to work because it is subject to floods. The stream rises in the mountains and in a few hours after each heavy rain it is a raging torrent. The rock formation along its banks is principally slate with thin seams of granite, while near the head waters a whitish rock, resembling gypsum in its appearance, was very common. The name of this rock, however, was unknown to every one who saw it.

About 20 miles above Sushitna station the Sushitna River receives from the west the waters of a small, clear stream called Croto Creek, the gravel from the banks of which when panned out gave many fine colors. Sergeant Yanert reported that he could obtain no colors a few miles above its mouth and probably all the colors came from the gravel banks near its mouth. It is not thought that gold will ever be found along Croto Creek in paying quantities.

Andrews, or Hanmore River flows into the Sushitna River from the east about 30 miles above the station and is said to have paying claims along it and its tributaries; one of which, Willow Creek, was very highly spoken of by some miners in the fall. Gold that was reported to have come from Willow Creek is broken and jagged with sharp edges and shows no sign of having been transported any distance. This is different from all the gold seen in Alaska before, which is more or less flattened and worn. Andrews River, and others flowing into the Sushitna from the east, rise in the mountains and flow through canyons which make them very difficult to ascend, when canyons are reached. The head waters of Andrews River are reached easier during the summer by going in by way of Knik and then striking it near its head waters. During the winter it is more accessible by way of Sushitna River.

All the streams from the east were more or less prospected the past season, and from what I could learn, with very poor success. It is true that not many of the prospectors succeeded in getting to the head waters of the different streams because of the canyons, and it may be that when more thoroughly prospected they will show up better than they did the past season.

Mr. Johnson stated that he was unable to get any colors from the Talkeetna, or its tributaries above the mouth of the Chinaldna River, and the same story was told me by the miners who went up the Talkeetna as far as Wasili's cabin. These men stated that they panned in all of the streams crossed and did not find anything that gave any promise of being valuable.

Mr. Johnson, who went up the Yentna, or Yedna River (Johnson River), stated that colors could be found along that stream, but that nothing has so far been found in paying quantities.

In 1897 a party of miners went to the head waters of the Middle Fork of the Sushitna River, but were unable to find gold in paying quantities. Their trip was the first one up the river and was hastily made, so that gold in paying quantities may yet be found when the country is more thoroughly prospected, as it will be the coming season. Sergeant Yanert reported, upon his return from the tributaries of the Tanana, that the rock formation of the country he traveled was principally slate and granite. He was unable to carry a gold pan with him and did no panning.

Very little quartz has been found in the Sushitna district and none that is sure to pay to mine. Mr. Johnson brought back with him from his trip to the Talkeetna some rock that some

thought would pay to work, while others were sure that it was valueless. As that rock had not been assayed when I left Cook Inlet, it is not possible to state whether or not it is valuable The rock is very heavily mineralized, principally with sulphides, and there is said to be a mountain of it.

The Indians reported a mountain of gold which was said to be located on the Talkeetna, near Wasili's cabin, and the miners who went there did so for the purpose of testing the story of the Indians. It proved, as every one thought, a mountain of sulphides which had deceived the Indians. Several specimens were brought back by the miners and they were sent below to be assayed, but the rock was not thought to possess any value. An old quartz miner who saw it, however, thought that it should be assayed, as it might be very valuable.

While at Sunrise City late in October I was shown some rock which came from the mountains between Turnagain Arm and Knik Arm, and the assayer's report on the same, which showed it contained about four dollars of gold to the ton and a dollar and a half of silver. It was reported to be free milling, easy to get at and in a very large quantity. Reports were also in circulation in regard to a rich quartz strike near the head of Turnagain Arm, which assayed several hundred dollars to the ton, but I was unable to ascertain as to the truth or falsity of the reports. A few small specimens of bornite, which came from the mountains east of the Sushitna River, were on exhibition at the station in September. The claim has been located very recently and no work has yet been done, so that the owners were unable to judge of the value of their claims. The specimens seen were very rich, and if the vein has any size the claims will be very valuable. No other copper ores were seen and none were reported by the miners met during the trip. Rock that came from the mountains east of the Sushitna River contained many sulphides, but not having the means of testing it, its value was not determined.

TIMBER.

The finest timber seen in the Cook Inlet country was found on Salmon Creek, a short distance from the head of Resurrection Bay. The principal varieties found in this region were spruce, cottonwood, pine, yellow birch, and some cedar. Some trees of the latter were found that were 3 feet in diameter, while trees of 2 feet in diameter of the other varieties were exceptional. As the timber line was approached the size of the trees diminished and more underbrush was found. On the trip from Resurrection Bay to Sunrise City the timber line was found to be at an altitude of about 1,600 feet, but this line varies, depending upon the slope and the exposure to the sun's rays.

In the valley of the Sushitna River the small islands are covered with a dense growth of cottonwood and underbrush, while on the mainland spruce trees predominate over the cottonwood.

At Croto Creek, where the boat was built, no difficulty was experienced in finding a spruce tree from which ten planks were sawed which were 35 feet long and averaged 11 inches in width. Many other trees were seen fully as large as the one cut for the boat. The finest timber seen in the Sushitna Valley was found in the vicinity of Croto Creek. On the Talkeetna River the timber line had an altitude of about 2,500 feet, but alder and willow were sometimes found as high as 3,500 feet above sea level.

None of the timber seen in Cook Inlet district would have any commercial value outside of the district. It makes good lumber for sluice boxes, cabins, etc., and has some commercial value as fuel. Most of the trees have too many knots to make fine lumber. The birch seen along the Sushitna River was usually very small, trees seldom being seen that were 15 inches in diameter. The birch, outside of the use of its bark for Indian canoes, is only used for fuel. Most of the birch trees were knotty, gnarly, and stunted. No willows worthy of the name of trees were seen on the trip, all being small and about the size of underbrush.

AGRICULTURE.

The word agriculture when applied to Alaska seems out of place to one who is not acquainted with the country, yet there are many of the hardier products now grown in the United States proper that can be grown there. At Resurrection Bay, May 30, some of the residents were

engaged in gardening and planting potatoes, several hundred bushels of which are raised every year at Tyoonok, and I have been informed they are also grown at the other settlements along Cook Inlet. Tyoonok is about 30 miles from the head of Cook Inlet, and while there I was invited to a dinner. Everything that came on the table was grown in Alaska except the flour and the butter. Among the articles of food on the table were the following: Bear meat, potatoes, turnips, rutabagas, currant jelly, and cranberry pie. Other vegetables that can be raised in Cook Inlet district are pease, lettuce, onions, radishes, beets, celery, string beans, and cucumbers.

Oats that were self-sown last season matured at Hope, in Turnagain Arm, which is not as favorable as Cook Inlet proper. Wheat was sown at Tyoonok last fall by a representative of the Agricultural Department, but when seen the middle of October did not have much of a start, due, perhaps, to late sowing. It seems as if it could be grown there, and it is well worth a trial.

Very fine grass is found along the shore of Cook Inlet and through the great valley of the Sushitna River. It is in such abundance as to be able to support a large amount of stock. The grass often grows as high as a man's head, and is so thick in places as to be more or less of an obstacle to passage through it. During the summer a better grazing country would be hard to find, but as the winter is long, it would necessitate curing a large amount of hay to last through the winter. Along the Sushitna River the almost constant rains during August would materially interfere with the work of curing hay and putting it up. Another drawback to stock raising, it would seem, would be the countless thousands of mosquitoes which swarm everywhere during the greater part of the summer. A member of the party who had been a cowboy for several years said that the valley of the Sushitna and its tributaries, as far as he saw it, was the finest grazing country he had ever seen both for sheep and cattle.

The valley of the Sushitna River is over 60 miles wide at its mouth, and 80 miles above is at least 20 miles wide, but from that point on it narrows rapidly until all the forks of the Sushitna flow through canyons. The temperature in the valley from the time the party started to ascend the river, June 19, until our return, September 18, was about as follows: During the middle of the day in the fore part of the summer the heat was so great along the banks of the river that at times work was suspended for about four hours. From June 20 until August 15 one blanket was usually sufficient during the night. The first frost came about September 1. The usual temperature at an elevation of 3,500 feet about August 1 was 60° F., and during rainstorms, at midnight, was 48° F. By September 18 all vegetation, such as vines, small shrubs, and trees, lost their leaves. All vegetation grows rapidly during the middle of the summer, when there is practically no night. The sun's rays keep everything warm, and there is always an abundance of warm rains, all of which conditions are favorable to the growth of vegetation.

Traces of farming are found along the banks of Lake Kenai, where the Russians used to put up hay, while farther down toward the mouth of Cook Inlet there are places where hay is put up at present. The soil of Tyoonok is a very light loam, and very rich. Along the west shore of Cook Inlet, in the vicinity of Tyoonok, a bluff rises about 150 feet, after which the comparatively flat country back to the mountains, distant about 30 miles, is capable of raising a large amount of vegetables and hardy products of the farm.

The valley of the Sushitna is very flat, and more or less swampy, due to a great extent to the moss which holds water, and because it has never been cleared. At times a bluff varying from 50 to 200 feet forms the bank of the river. Many of these bluffs contain considerable gravel, but a large portion of the valley could be made into good farming land when once cleared. All of the valleys traversed and the larger portion of the mountains crossed would afford fine grazing, as the grass grows well up on the mountains, except on the steep northern slopes.

The principal berry found in Alaska by the party was the huckleberry, of which there are two varieties. The ordinary round berry, common in the United States, was very plentiful, generally growing on a shrub about 8 inches high. Occasionally an oblong berry, resembling the ordinary berry in color only, was found. This was sweeter than the other, and grew on a plant which barely reached through the moss. Both varieties of these berries were generally above

the timber line on the southern slope of the mountains. Fine cranberries are obtained in the fall along the low ground. A few wild currants are found along the banks of the Chinaldna, while it is reported that farther down the river, in the vicinity of Cooks Inlet, they are very plentiful. No wild strawberries were seen by any member of the party during the trip, and only a few raspberries were found. A peculiar berry, called the thimble berry, growing on a small, low plant, which resembles the strawberry plant, was frequently found above the timber line. This berry is full of seeds and about the size of a thimble, from which it undoubtedly derives its name. Shortly before it ripens the berry becomes red, then turns yellow and becomes more or less tasteless. If picked when red and stewed, it tastes fairly well. The berry ripened in the Talkeetna country about August 1. A small black berry that grew on the moss was found to be tasteless, and no one would eat it if any other berries could be had. The moss berry ripens about August 1, and remains on the moss until the new crop pushes it off.

GAME AND FUR-BEARING ANIMALS.

Throughout the valleys and mountains of Alaska there are many game and fur-bearing animals, among which are found the following: Moose, caribou, mountain sheep, bear, wolves, lynx, wolverine, beaver, foxes, martin, parkee squirrels, ducks, geese, pheasants, snipe, swan, and crane.

Moose were said to be very numerous around Cook Inlet a few years ago, but owing to the numbers killed by the Indians and miners during the past few years in the immediate vicinity of the coast they have rapidly diminished, although I have been informed by Sergeant Yanert, who went to the tributaries of the Tanana, and by men who have wintered in the Yatnu Mountains, that there are large herds still in those portions of the interior. Few signs of moose were found on the Talkeetna and its tributaries. Moose are also very numerous in the interior of the Kenai Peninsula. (15 a.) As an instance of the way in which this noble game is slaughtered, I was informed that last winter a trader in the Cook Inlet country paid the Indians $1.50 for the head and scalp of the moose, and that in a very short time the natives near this trading station had killed over 50 moose, taking generally nothing more than the scalp and head, leaving the rest of the moose for the wolves or to rot on the ground. The moose is very shy and hard to kill, except in the rutting season, when the bull will at times charge at the slightest sound, and becomes a very dangerous animal to meet. When a crust is found on the snow sufficient to bear the weight of a man on snowshoes, the moose is readily killed in large numbers near the so-called yards.

Caribou are quite plentiful in the interior along the mountains, where there is an abundance of the caribou or reindeer moss. The Indians say that they are very difficult to kill, but the experience of the members of the party is that the caribou is far easier to kill than the moose. When first fired upon, the caribou jump around and run together, as if for protection, and if they can not see the hunter, or can not wind him, he can fire away until several of the band have been killed. While making the trip with an Indian we killed 4 caribou in six days and the Indian wounded 3 more; the meat not needed was given to Indians, or was cached for later use. One day the Indian saw 5 caribou, and requested permission to try and kill one, and as the meat was nearly used up permission was given. Soon several shots were heard, and going up to the Indian I saw a fine caribou on the ground, and he pointed out three others limping away, saying they were sick. When I asked him why he had shot so many, he replied that he wanted to see how many he could kill. I tried to explain to him that it was bad to kill game unnecessarily, but he will do the same thing over again as soon as opportunity presents itself. If the Indians were not so wasteful of the game, it would last them a long time, and would with judicious protection increase instead of decrease. But at the rate it is now being slaughtered it is rapidly decreasing.

Mountain sheep are reported to be very plentiful in the mountains and to afford the finest meat that can be secured in all of Alaska. The sheep are always found above the timber line during the summer on the most rugged and jagged peaks, but when snow commences to fall they are driven down, until in the middle of the winter they are found in the valleys. While

some claim that the sheep are very hard to kill, others found them quite easy. A few mountain goats are found in the Cook Inlet country, but they are reported to be very plentiful in other parts of Alaska. (16 and 17 a.)

While in Alaska I saw three varieties of bear, viz, the brown or cinnamon, the black, and the gray or so-called "glacier" bear. Some old residents also say that there is a grizzly bear in the Cook Inlet country, but none were seen by any member of the party. The brown bear attains an immense weight and size. Generally he will not molest a man unless first attacked, when he will fight. The Indians around Shushitna Station are very much afraid of them and I was cautioned by old residents to not molest a brown or cinnamon unless well prepared for him. While descending Lake Kenai one of the party saw a cinnamon bear about 1,000 feet above the level of the lake; about the time the bear was discovered he noticed the party in the boat and started down the mountain side, when the boat was promptly beached and preparations were made to receive him. When shot, the bear was only about 200 feet above the level of the lake and still coming down. At another time 4 brown bear were found eating meat we had cached, and although we approached within 200 yards of them no notice was taken of us by the bears. The black bear are the most numerous and valuable, on account of their fur, and the least ferocious of all the varieties of Alaskan bears. The gray or "glacier" bear is said to be the most ferocious, and always ready for a fight. These bear are reported to attack men without the least provocation or warning.

The wolves are not very numerous; still several gray wolf skins and occasionally a black one are sold to the traders every winter. A few link and wolverine are also killed each season. Beaver and martin are more plentiful and valuable.

The most valuable fur-bearing animal in the Cook Inlet country is the fox, of which there are four varieties—the silver gray, the black, the blue, and the red. The silver gray and black are the most valuable, while the blue brings a good price and a ready sale. Some of the small islands along the coast have been occupied by white men who have engaged in raising blue foxes for the market, feeding the foxes on salmon. Whether this business will be a profitable one or not no one seems to know definitely.

Rabbits are said to be very numerous at times and then to practically disappear, and no one in the country is able to satisfactorily explain the reason for such periodic changes. In the nine months spent in Alaska I did not see a single rabbit. The parkee squirrel is a small animal which burrows in the ground and is found above timber line on the southern slopes of the mountains. The Indians are careful to preserve the hide of all those killed, tanning them and making parkee squirrel robes. Many of these robes contain from 100 to 200 skins, and make one of the best blankets for use in Alaska.

Alaska is a great breeding ground for ducks, geese, and snipe, and in the spring and fall these birds can be killed by the hundreds. The ducks and snipe breed in the Cooks Inlet country, while the greater part of the geese have their breeding ground farther north. Nearly all varieties of these fowl are found in Alaska. A few swan and crane were seen. Another food bird is the pheasant, of which there are two varieties—the ptarmigan and the gray pheasant. The latter resembles the native grouse of Washington, but is considerably smaller. The gray pheasant was not seen above timber line, while the ptarmigan during the winter is below timber line and in the summer always above that line. In the winter both species of these birds feed off the spruce trees and during the summer feed principally on berries. The ptarmigan, unlike the gray pheasant, changes its plumage with the season, being brown and spotted during the summer, and as winter approaches changing with the verdure, until eventually it is snow white, rendering it almost invisible when on the snow.

Another small bird, resembling the gray grouse of Washington, and about the size of a "bobwhite" quail, would, when shot at, run on the rocks and hide. It was seen a few times above timber line at an elevation of about 3,500 feet. No one in Alaska could tell me the name of the bird. For some reason or other the Indian with me would not shoot them, saying that they were no good, but at another time, when the same birds were seen, some of them were shot, and, the meat supply being low, they were eaten and found to be as fine a table bird as any member

of the party had ever eaten. This bird did not appear to be a migratory bird, but in the opinion of the party it was a species of the pheasant or grouse.

Among other birds the following were found in that portion of Alaska: Hawks, eagles, owls, camp or Hudson Bay bird, ravens, gulls, loons, plover, and curlew. When ascending the Sushitna River many of the large white sea gulls were seen with some of their young, but all had gone when the party came down the stream in the middle of September. One noticeable feature about the birds of Alaska was the absence of all song birds.

The agents of the trading company state that the amount of furs secured now is far less than the amount secured a few years ago. At present the fur business pays, as all furs are exchanged for goods from the stores, on which a good profit is made as well as on the furs. It was reported that the agents of the Russian trading companies, when Alaska belonged to Russia, used to allow so many furs of each animal to be taken each year, and any Indian securing more than the number allotted to him was severely punished. By such a restrictive policy the fur-bearing animals did not decrease, and in consequence they were very plentiful in Alaska during that time.

Along the coast in Prince William Sound, as well as in Cook Inlet, there are plenty of fish, the principal varieties of which are cod, halibut, flounders, candle fish, and salmon, of various varieties in season. Thousands of cases of salmon are packed and shipped away from the region, while thousands of salmon are simply thrown away because they are not of the choicest varieties. By such a wasteful policy several other species are being rapidly destroyed which in the future might become a valuable addition to the food supply when the more valuable ones are no longer plentiful.

During the month of May and part of June candle fish run in countless thousands up all the streams flowing into Cook Inlet. The candle fish belong to the smelt family, are about 6 to 8 inches in length, and are very oily. After each tide, when these fish are running, the Indians pick them up from the beach. These are then dried by the Indians and put away with the dried salmon as part of the winter's supply of food. Nearly every part of the fish is preserved, the bones and head ostensibly for the dogs, but are generally used by the Indians, as the supply is usually insufficient.

Every fresh-water stream contains plenty of salmon after they start to run, as the fish endeavor to get to the head of the stream before spawning. It is stated that these fish never go back to the salt water, but all, with the exception of the king salmon, eventually die in the fresh-water streams. On some of the streams there were so many dead salmon that the water was polluted and there was a very disagreeable odor arising from the dead fish. At this time of the year the grass along the streams is trampled down by the bear which come down for the fish, catching and eating as many as they care for and cacheing the balance. By the time the salmon have traveled up to the heads of the fresh-water streams they become thin and are eventually covered with white spots by the attacks they make on each other and by striking against rocks and snags in the streams. They can be eaten if there is no other food to be had. Every salmon caught in fresh-water streams, when dressed, from the condition of its entrails, showed no signs of having had any food for some time.

The clear-water streams are well stocked with trout, among the species of which were the dolly varden, rainbow, and brook. These trout are not as gamey as those caught in the States, but are of good size, weighing about 3 pounds, on the average. One evening four members of the party caught in fifteen minutes 16 trout, the smallest weighing about half a pound and the largest one more than 5 pounds; the others about 3 pounds each. No trout were seen or caught in the glacier streams, due probably to the muddy water, as this fish prefers clear water

ANIMAL BEST FITTED FOR USE.

Residents of Alaska do not agree as to the best animal to use for transportation purposes both winter and summer, and I was in the country such a short time that no definite opinion could be formed by me.

There is an abundance of grass in the country for stock of all kinds, so the food question is not so essential, if the animals are to be used near a settlement where hay has been put up, as it

would be if the animals were to be used in a new country where they would have to pick up their food each day or have the food transported.

Members of the party under the immediate command of Captain Glenn stated that the horse is preferable to the mule, as the latter animal is prone to give up as soon as he comes to soft ground. Then, the mule is not a good swimmer, giving up as soon as water gets into his ears, and that is important, for if a person goes into the interior any distance many streams will have to be crossed, and generally by swimming the animals. During the summer horses can be taken anywhere in the country traversed by members of my party by being careful to avoid the swamps and marshes and by taking loads suitable to the country. The horses, if turned loose at night, can easily pick up all needed forage. Forage would have to be carried in winter, however, as all grass is buried under deep snow, and it has lost all of its nutritive qualities. Moose feed on the tender willow bushes and other shrubs, and it is stated that the horse will do the same, and if so, a horse could partially pick his own living in the winter. For transportation purposes in summer, from what could be learned, it would seem as if the horse is the most suitable animal.

If reindeer will do all that is claimed for them and can travel in deep snow, they might solve the winter transportation, as the caribou or reindeer moss is found nearly everywhere above the timber line. In places it is so thick that it whitens the appearance of the mountains. The native caribou (sometimes called reindeer) feed off of it most of the year.

The Indian dog is used by the natives to pull loaded sleds, and with good results, as 40 miles are made in that manner in a day. Feed in the form of dried salmon is fed to the dogs in the winter, while in the summer they are expected to pick up their own food. They are sometimes used as pack animals in the summer, carrying packs weighing from 15 to 25 pounds.

In the past, with the small demand for transportation, the dog was the only animal tested and he proved more or less satisfactory, but as the need for transportation increases it is probable that the dog will not be able to fulfill the additional demands.

Horses are used in the Northern States where the snow is as deep as it is in the Sushitna Valley, but roads exist in the States and are kept open all winter, while in Alaska there are no roads and almost no travel. Pack animals have been kept for several winters at Sunrise, wintering in good shape on hay made from the native grasses, with very little grain.

Horses will probably come into more general use as the country is developed and will prove as satisfactory as they do in the Northern States, but it is scarcely likely that in the unsettled portions the dog will be replaced by the horse or any other animal for transportation purposes.

RECOMMENDATIONS.

The best of food should be provided for a party going into the interior another year on similar work, and the ration should be increased in some things and have some additions made to it. It should be put up in convenient packages for transportation and the perishable articles in waterproof sacking.

Plenty of dried fruit of assorted varieties should be provided as part of the ration, as fruit is a good preventive of scurvy and it is an article much craved by all. While berries can be be picked in season, few can be found until about August 1.

The allowance of sugar is insufficient and should be increased about 50 per cent. The sugar furnished for the use of the party became wet from the constant rain and from men jumping into the boat when it had been towed into water too swift or too deep for them to wade. After the sugar became wet it was impossible to dry it out, but instead it dripped away and about 25 per cent was lost, the remainder becoming so saturated with dirt that if any other sugar could have been secured that with the party would not have been used. When the party arrived at Sushitna Station and a variety of food could be secured, nearly all made the first meal out of bread and sirup, such was the craving for sweets. If none of the sugar provided for the party had been lost the allowance would still have been insufficient. Sugar should be put up in waterproof packages.

The vegetable portion of the ration should be furnished in a desiccated state, and as it is easily ruined by water it should be put up in waterproof packages. Bacon spoils quickly in such

a moist climate, unless it is thoroughly smoked. Of the bacon provided for the use of the party, that portion intended for issue was in very poor condition in October, having been but slightly smoked, while the breakfast bacon had been thoroughly smoked and was in a far better state of preservation than the issue of bacon.

Flour after getting wet usually dries and forms a cake inside the sack, but where it is handled as much as the flour for the use of the expedition the cake is constantly breaking, and each time it is wet the water works in farther, until all the flour in the sack is spoiled. After provisions are transported into the interior many miles from a place where a new supply can be obtained, the loss of a portion becomes a serious matter.

More black tea should be taken than is needed for the use of the party, as there is no food so highly prized by an Indian as black tea, and to secure it he is willing to do any service desired. Before Indian guides could be obtained at Sushitna station it was necessary to buy plenty of tea.

An Indian, when he first comes to camp, expects to have a cup of tea and some crackers at least, and if these articles are not given he will not talk, but if they are he will furnish all the information he possesses.

Some chocolate should be provided, as it is very nourishing. Soldiers who are required to wade in the water and be wet every day, as members of the party were while ascending the streams, need the best of food and more variety than there is to the ration.

The whipsaw furnished from the tools of the relief expedition was worthless, and nothing could be done with it. A good whipsaw was borrowed from the Indians and used until lumber for the boat was sawed. The best of tools should be provided and all required furnished. In the outfitting of an expedition the opinion of an officer who has been in Alaska should be given great weight. I was informed that the chief men of the Geological Survey parties were given a certain sum of money for the use of their respective parties, and were allowed to secure such food and supplies as they deemed necessary, and were not hampered by regulations which interfered constantly with the successful completion of the task assigned to them. The army expeditions should be treated in the same way, the commanding officer given discretionary powers as to the manner in which his task should be solved. He should be provided with the necessary funds and be able to pay every employee in cash. When checks are given they are heavily discounted and the native or other employee suffers in consequence, while, if, as was usually done because of lack of funds, service vouchers are given, the employee is kept out of his pay for months, or if he sells it the rate of discount is higher than on the check. Such methods of doing business are prejudicial to the interests of the Government, and it is not surprising that a higher rate of pay is demanded for services performed for the Government than is required for the same service performed for private parties.

To keep faith with those employed by me, especially the Indians, resort was had to private funds, and later arrangements were made with the Alaska Commercial Company to take the service vouchers. By this means the Indians were protected somewhat, but it is quite a commentary on the Government's methods of doing business to state that such an arrangement was necessary.

Arrangements should be made by the proper officers of the War Department to do away with the majority of the vouchers and papers required for the settlement of accounts upon the completion of the season's work.

If vouchers are required from a mistaken notion that the interests of the Government are protected by their use I might state that men can be found anywhere to sign any voucher desired. If it is done because an officer can not be trusted, then such an officer should be discovered and put out of the service. The present arrangement of doing business tends to bring the Government into disrepute, and should be modified in a country like Alaska.

During the summer a few men were bothered once or twice with bowel trouble, and nearly every member of the party was bothered to a greater or less extent with the rheumatism. There was no other sickness among the members of the party.

Each and every member of the party under my charge afforded me all possible assistance and

performed every duty, no matter how disagreeable or hard it might be, as cheerfully and perfectly as possible under the conditions. It seems very hard that by reason of being in Alaska some of them suffered in promotion while performing as hard and faithful service as if they were at the front on the field of battle.

Sergeant Yanert, Troop K, Eighth Cavalry, has proven himself a worthy man and thorough soldier, well meriting promotion to the grade of a second lieutenant, and he is recommended to the authorities for favorable consideration whenever promotions to that grade are made from men serving in the ranks. Attention is respectfully invited to his map and report and to the manner in which he performed all the duty intrusted to him. If work in Alaska is to be continued no better commissioned officer for such work could be secured, if he is promoted to that grade, than he would prove to be.

A TRIP TO THE TANANA RIVER.

By Sergt. WILLIAM YANERT, Sixth Cavalry, U. S. A.

My instructions were to break camp on the Chaniltna River, Alaska, and proceed to the Tanana River. I was to take with me all the rations I could carry. My associates in the expedition were Private Jones, Company D, Fourteenth Infantry, and Bate, a Skittig Indian, who was to act the part of guide. When I reached the point of destination I was to follow the trail I had previously traversed. If before reaching the Tanana I considered it too hazardous to proceed further I was to return to my starting point. If, on the other hand, I should succeed in reaching the river named and then consider it unadvisable to return, I was to proceed down the river to the Yukon, thence to St. Michaels, and report upon my arrival to the commanding officer of the post. When I reached the Tanana I was to send to Lieutenant Learnard a report of my arrival by some Indian courier. In case the camp was abandoned the courier was to carry the dispatch to Sushitna station. My instructions also required me to make a topographical map as well as a detailed report of the country traversed. Rations were to be left for me in the cache on the ridge near my former camping ground, and notice of the breaking up of the camp was to be posted at the latter point. If when I returned I found the old camp abandoned I was to proceed to Sushitna station, and from thence to Tyoonok, unless my instructions were found to be altered in the notice posted at the cache.

Accompanied by Private Jones, Fourteenth Infantry, and under the guidance of the Indian Bate, I left Lieutenant Learnard's camp on the Chaniltna River on the morning of August 12 and proceeded in a northwesterly direction, following more or less closely the left bank of the Chaniltna, for a distance of about 12 miles. From this point the route ran to the north, following the divide between the first and second forks of that river, and thence continued past the head of the second fork, in the same direction, until the Middle Fork of the Sushitna was reached. The Middle Fork of the Sushitna River was here crossed on a raft, the landing being effected immediately below the mouth of a stream known as Indian Creek, which joins the Sushitna from the northwest at a point about 8 miles south of the falls.

The course taken from the mouth of this creek ran in a westerly direction to a range of mountains. These were crossed by way of a pass having an altitude of 3,000 feet, and beyond this range the course again turned northward and continued at the foot of the range to the headwaters of the Sushitna River, which is a third fork of the Sushitna. Here the divide was reached and crossed, and on September 3 I arrived at a river which came from the northeast, which stream made a sharp turn, after which it proceeded in a northerly direction. The guide said it was a tributary of the Tanana. I took it to be the Cantwell River.

Upon arriving at this river the guide refused to continue in service as such; I therefore abandoned further progress. I began the return journey September 4, going to the mouth of Indian Creek via the same trail over which I had come; from thence I proceeded by raft to the forks of the Sushitna, from which point a walk of 5 miles brought me to Lieutenant Learnard's camp.

I carefully noted the nature of all the country traversed. From beginning to end I found it exceptionally well suited for a summer pack trail. That portion of the route which begins on the Chaniltna and ends where the Sushitna was crossed is, in its present state, fit for such a trail and an excellent one could be located and established there. I am equally certain that this trail could have its starting point at or near the mouth of the Talkeetno (East Fork of the Sushitna), and it would thus cover a distance of 45 or 50 miles.

A dense forest of pine, spruce, cottonwood, and birch covers all the lowland adjacent to the forks of the Sushitna and extends to the foot of the higher ground to the north, a distance of 10 to 12 miles. After this wood is passed, no timber is found until the Sushitna is again reached. Alder and willow bushes, however, are plentiful along the entire distance. Good water is obtainable everywhere. The footing in the timbered lowland, though not firm, is generally good, and on the upland stone and slate predominate.

The streams in this section are numerous. The largest of these, however, is but 8 yards wide; all have stony beds and are fordable. The altitude of the highest point encountered was 3,100 feet. The descent into the valley of the Sushitna River was quite abrupt, the drop being from 2,700 feet to 750 feet. A fairly gradual grade is, however, possible. The Sushitna River itself presented the only serious obstacle to an animal pack trail thus far encountered. Its width varies from 250 to 600 yards. The current is about 6 miles per hour. The channel, though greatly divided by gravel bars and wooded islands, is too deep for fording and could hardly be bridged in the usual way on account of floating timber during times of high water.

The ascent of the mountains crossed between this and the third fork of the Sushitna was laborious. The Indian trail leading to the pass was apparently chosen on account of directness rather than ease. The pass itself is open and free from obstacles and has an elevation of 3,000 feet. Beyond this range the footing is excellent two-thirds of the distance to the point from which I returned. Several very extensive swamps were crossed, the greater part of which could have been avoided. Timber is abundant and within easy reach. Many streams flow from the mountains to the West Fork of the Sushitna, only two of which can prove troublesome during high water, and this less on account of their width than their rapidity. Either of these streams can be bridged with timber growing on its banks.

The divide between the headwaters of the West Fork of the Sushitna and the river flowing northward is low, 2,600 feet, and has the appearance of a valley from 7 to 9 miles in width. A belt of spruce extends across from north to south. A well-worn footpath leads over the divide, which the guide assured me was made and used by Indians going to and from the Tanana. He also pointed out the frames of two Indian houses north of the divide, stating that these were used by the Tanana Indians during the hunting season. Moose and caribou signs were plentiful in this locality and it appeared to be the wintering place of game and other animals.

Upon reaching the tributary of the Tanana, the guide informed me that he was not acquainted with a trail from here on and gave me to understand that he had made the trips only during the winter on snowshoes. I had, however, good reasons for doubting his word. As I could not induce him to continue the journey, I discharged him and determined to continue without him. I thereupon followed the bank of said river around to the west, where it made a sharp turn to the north. The Indian, seeing this, called me back and directed me to cross the stream farther up, telling me I would soon come upon a trail on the other side. I did so, and shortly afterwards found the trail. In following this trail I came upon the tracks of a party of white men, whom I guessed to be the party under Mr. Eldridge. Being by this time dependent upon game and berries for subsistence, besides being barefooted, I abandoned farther progress, assuming that the remainder of the route would be reported on by the party ahead of me.

Referring to this river, which I, probably erroneously, took to be the Cantwell, I would say that it is a considerable stream, being at the time of flooding probably 60 yards wide, nearly 3 feet deep, and of a strong and swift current. Its water was nearly clear, the banks timber-clad, low, and stony. The indications of high water convinced me that at such times the width of the river would be more than doubled and that fording would be impossible. The river came from the northeast, out of a long, narrow valley, and upon reaching the foot of a chain of mountains took a decided turn to the north, continuing thus to another range of mountains, which it pierced

by way of a canyon. It was joined near the turn by a considerable tributary, whose head overreached that of the Sushitna, and by another and larger river just previous to entering the canyon.

The Indian had intimated to me that the Tanana could be reached in three and a half days from where this river was struck, and I might have been able to reach the same had I been equipped with a couple of pack animals. As concerns the Indian's refusal to remain in service as guide, I feel certain that his unwillingness to do so was prompted by fear of the Tanana Indians, who, he frequently assured me, were very numerous and bad.

In speaking of the animal food supply which this section affords, I would state that hay of fair quality can be made on and in the immediate vicinity of all swamps. Grass is quite abundant in the timber, in the gulches, and on the lower slopes. Reindeer moss grows everywhere above timber line, which appears to range between an altitude of 1,900 and 2,200 feet. Moose, caribou, beaver, marmots, ground squirrels, ptarmigan, and blue grouse are obtainable, and especially so near the divide. Several varieties of berries grow in vast quantities on the uplands and mountain slopes. I noted the blueberry, huckleberry, mossberry, and thimbleberry there. High bush cranberries, red currants, and raspberries were plentiful in the timber. Fish, such as three species of salmon and two of trout, were seen by me only in two streams, the Chaniltna and Indian Creek. Water fowl were exceedingly scarce throughout. Song birds were entirely wanting, but several varieties of small forest birds were observed. Insects were plentiful and annoying. These were the mosquitoes, black flies, gnats, and small spiders. I do not possess a sufficient knowledge of minerals to speak of them. I noted that slate was the chief formation east of the middle fork of the Sushitna, and granite, slate, and black rock to the west of it. Coal, such as is found on the shores of Cook Inlet, exist in large quantities on the Chaniltna, the middle Sushitna, and on one of the tributaries of the west fork of the latter river.

A mining party of six men was engaged on the lower Chaniltna, who had taken enough gold from the river to warrant operations. A similar party was found encamped at the mouth of Indian Creek, which was unable to do any work on account of high water.

UP THE CHICKALOON AND DOWN THE TALKEETNA.

By Sergt. FREDERICK MATHYS, Fourteenth United States Infantry.

Accompanied by Guide John S. Bagg and an Indian, I started on my expedition August 1 at 7 p. m. After cutting out the trees and underbrush for about 5 miles I struck a trail which led us directly from the river up on to a flat about 400 feet high, over which we traveled for a distance of 2 miles. We crossed a small clear stream, a tributary of the Chicaloon, about a half mile from its mouth. This stream flows in a northeast direction, is not very deep, but has a very swift current. The entire flat is covered with a heavy growth of spruce, cottonwood, a few birch trees, and also with some underbrush. Farther on the trail is swampy. The remainder of the trail presented few difficulties. The grass was good, and dry wood was found in abundance. To this point the distance traveled was about 5 miles.

On the following day the trail went in a northerly direction along the Chicaloon River. Being an old Indian trail it was in good condition, except in a few places where the river had destroyed the banks entirely. Two tributaries of the Chicaloon, glacial streams, we forded easily. The beds of both of these streams were thickly covered with float granite. Ten miles of our journey this day was through a rolling country, which contains a great deal of timber similar to that through which we passed the day previous. Along the route were found blueberry, currant, and mossberry bushes. Although the soil is light and thin, we found plenty of good grass for our stock.

On the morning of August 3 the animals were found to be very footsore. The formation of the country through which we passed seemed to consist principally of gray quartz mixed with granite. We found plenty of signs of mountain sheep on our side of the stream, and large numbers of them were in sight all of the time on the other side of the river. The trail the next

day was nearly due north and about of the same character as that traveled through the day previous. We crossed three tributaries of the river, the first being clear water, the second a very swift glacial stream, and the third a small stream of clear water. In each stream we found float granite and quartz. In prospecting the next day I found a vein of coal running across the ridge 4 feet in width, and apparently a very good quality of soft coal. The Indian, for his day's work, killed a black bear. We now discovered that our stock of matches and tobacco was getting low. We occupied part of August 7 in panning for gold in the sand on the bars, but could get no colors.

We broke camp early the next morning in a light rain. Our trail led nearly due north for about 6 miles. From that point our course was nearly due east. The river was crossed at the bend. Up to that point no timber was found along the river. Berries grew more numerous as the timber decreased. A number of small streams was crossed on the left side of the river; all of the streams were clear water. On the right-hand side three quite good-sized streams were crossed. All bore evidence of carrying at times large quantities of water. In the spruce and cottonwood grove in which we camped on the right side of the Chicaloon we found plenty of grass and wood. By this time our stock was very footsore and the shoes of the men were nearly worn out.

We found blueberries and currants, as well as black bears, plenty in this section. We traveled 6 miles August 9, which carried us to the foot of the divide. We then crossed the river and camped in the last timber to be found on the Chicaloon River. A few stumps were discovered at this point, which would indicate that the fir at one time grew here. At this point the river bed is very wide and the banks of the stream are subject to overflow. This fact frequently changes the channel of the stream from one bank to the other. The beds of all the streams that we saw are covered with rock, presenting the appearance of cement mixed with coarse gravel. On going up the divide the ascent was found very steep and was covered with sharp rock, which presented the appearance of having been broken up artificially. The top of the divide is nearly level, but it is cut through by several canyons with almost vertical banks. The river near our camp turns due north, and there is a glacier a half a mile distant just at the end of the Chicaloon. Quite a large stream flows from the glacier into the Chicaloon just above where we had our camp.

The following day I sent a packer and one animal up on the divide to ascertain if it were possible to avoid the canyons. This they succeeded in doing by passing around the heads of them. The guide reported that he had been unable to find a trail down to the Talkeetna River or its tributaries, because each of these run through box canyons with nearly vertical walls. The Talkeetna River is a tributary of the Sushitna. The stock broke into our rations during the afternoon and destroyed one sack of flour.

Accompanied by Private Ayers I went over the divide, August 11, a distance of 14 miles, and arrived at the head waters of the Talkeetna at 4 o'clock p. m., going into camp between two large glaciers at the junctions of the streams flowing from them. The following day, after traveling about 4 miles, I found a place to get down to the river. There is an Indian or game trail that leads down at this point to a low, flat country, which is well timbered with spruce and cottonwood. In this flat a tributary of the Talkeetna coming from the lake flows into the main stream. After discovering this trail we turned back to the main camp, carrying, in addition to our packs, about 50 pounds of meat cut from the caribou killed the day before. We managed to reach this camp the same evening.

Mr. Bagg the following day examined the guide as to his knowledge of the country, and found that he had a very dim recollection of it. He stated that he traveled over it in the winter season when he was without rations of any kind, and that he had not been over the trail since that time, fifteen years ago. He consumed eight days going up the Talkeetna on snowshoes from the point where he reached it, and below which point he knew nothing of the river. I calculated that from this point to Wasili's cabin it would require twenty-five days' travel with a pack train, since it will necessitate the cutting of trail and the construction of rafts for crossing the stream. The Indian also informed me that the other Indians will not stay in this section of the country for fear of getting snowed in, and that we were liable to have a snowfall within two weeks. Deem-

ing it impracticable to take all of my party over, I decided to send a guide and one man across, giving them two animals, and with instructions to prospect the head waters of the Talkeetna River. As I considered it necessary to have a clear day to take the stock across the divide, and the rain not having ceased, we decided to spend August 14 in camp and in hunting. Mr. Bagg, the scout, became sick the following day, and we were therefore unable to travel. The day was utilized in repairing our shoes with rawhide cut from one of the kyacks.

The scout being still too sick to travel on August 16, I went up onto the glacier alone, but it was too foggy to see anything. The guide, accompanied by Private Dillinger, started out across the divide with two animals August 19. The horse was shod and passed over the country without trouble, but the mule, being barefooted and tenderfooted, caused considerable trouble in making the ascent. They both carried light loads. I went into camp in a well-protected spot with plenty of grass and fuel. Large quantities of berries and currants were found, and also an old Indian cache. As the stumps of all the trees that had been cut down were very high, I inferred that the Indians use this for a winter camping place.

August 20 I gave the guide instructions to proceed down the Talkeetna as far as possible, making use of the animals. If practicable, he was to report upon the condition of the country and river and to return to the main camp on the other side of the river not later than September 2. I then returned to the main camp and found that the packer and the Indian had left on the day before. The packer and Indian returned August 22 and reported that they were unable to take the stock up Canyon Creek, as it runs through a box canyon with vertical walls, and that they had gone down the Chicaloon and examined some other creeks, but without success. They brought into camp two mountain sheep, the meat of which we found to be far superior to that of the caribou.

On August 23 I sent Private Ayers over to the camp on the Talkeetna. On the day following an attempt was made to examine the mountain range to the north, but on account of the fog and rain nothing was accomplished. Private Ayers returned about dark, reporting that the guide was still in the camp where I left him.

Private Ayers and the packer were sent to examine the north side of the glacier August 25. Although they succeeded in getting about 10 miles from camp, the crevasses in the ice cut off farther progress, and they were unable to determine the extent of the glacier. It is more than probable that King Creek, the Chicaloon, and the three branches of the Talkeetna rise in one glacier or are branches of the same. The party above named reported having found some float quartz. Fog and rain prevented a move being made until August 27, when I went down the river 7 miles. Some trouble was experienced in crossing the streams, which I found to be somewhat more swollen than when we crossed coming up.

The following day the guide and Private Billinger returned to the camp. The guide reported that they had thoroughly prospected the head waters of the Talkeetna, but found no gold, although plenty of quartz containing iron and other metals was seen. The guide had gone down the Talkeetna about 10 miles, but was unable to proceed farther on account of deep cuts and canyons. He reported that the valley of the Talkeetna is about 9 miles wide at a distance of about 20 miles from its source, and that it slopes gradually to the mountains on either side. He further reported that there is plenty of timber in this valley, principally spruce, as well as plenty of berries, principally blueberries and currants. He found the soil very heavy and of a reddish color.

A move of about 18 miles was made down the river on August 29, and on August 30 about 15 miles were traversed. Camp was made about a mile above the point where Captain Glenn crossed the Chicaloon. The grass was excellent. August 31 I split up my party at the crossing of the Chicaloon, giving the guide and packer five animals, with instructions to go out on Captain Glenn's trail for the purpose of caching provisions for the use of his party upon their return. I left it to their discretion whether they should return to the Knik or wait for the return of Captain Glenn and his party. With the remainder of the detachment and four animals I returned to King Creek, at the mouth of Young Creek.

September 1 I traveled to Moose Creek, and on the following day, in a drenching rain, finally reached the lakes, a distance of 18 miles. The cabin at the head of Knik Arm was reached September 3.

A TRIP UP THE CHICALOON RIVER.

By Guide JOHN S. BAGG.

I left Chicaloon Crossing August 31, 1898, and proceeded up the river bottom along the Chicaloon River. After climbing about a quarter of a mile I found that the stream enters a fine little valley, about 2 miles in length. A short distance to the left, about halfway up the trail, is an Indian cache structure in good repair, near the water. From this valley the trail turns to the right for a short distance and then descends abruptly to a clear and rapid stream Four Mile Creek. From this point on for the distance of a mile the country is rough and the trail had to be cut through heavy timber. Abundant grass was found at our camp, which was on the banks of the Chicaloon.

The next day the trail followed the river bottom most of the distance and was comparatively good. Its course was in a northerly direction. The mountains on both sides of the trail were rugged and precipitous. The rock formation at this point is of a sedimentary character, being of brown sandstone, varied with an extremely hard conglomerate. Panning shows gold in the gravel along the river, but the particles are extremely light and fine, making it improbable that pay dirt will be found on this river or its tributaries. Timber and vegetation, similar to that on the Matanuska, diminishes with the increase in elevation. The water of the Chickaloon has a milky appearance all the time, indicating glacial origin.

We proceeded, August 4, 10 miles over a fairly good trail along the river bottom. Five miles after starting we came to Moose Creek, which flows to the northwest. This stream is of considerable size. Four miles farther on we found Ice Creek, which is about the same length as Moose Creek and flows in the same direction. Both of these streams must carry large volumes of water at certain seasons of the year. Reindeer moss is found along the trail. I noticed that the timber decreased in size as we advanced. Ample food was found for the stock. During twenty-five years of prospecting and mining I have never seen a country in which pack animals can be handled as easily and made as serviceable as in this. I saw less than a dozen birds after I left tide water. Included in the number I saw were two or three ravens, a robin redbreast, a pair of camp birds, and a small yellowish bird that resembles the well-known sapsucker. The rock in this region has changed to an eruptive character. Quartzose, highly mineralized with iron sulphides appears on the rim of the canyon. Sandstone has been displaced by granite.

On the afternoon of August 6 I went up the mountain to the northwest, where I sighted a glacier about 2 miles distant from the farthest point reached, which, no doubt, is the head of Ice Creek. Wild flowers were found to be more abundant and varied on the uplands than in the valley. In the varieties seen were the golden-rod and forget-me-not. To the west of the river the sedimentary formation is replaced by granite rocks. Much mineralized quartz makes its appearance here in irregular and detached masses, the formation being too disturbed to admit of veins.

We advanced, on August 8, 9 miles over an easy trail, most of the way in a river bottom. Camp was made at the mouth of Canyon Creek. The Indian guide stated that this was a favorite hunting place during the fall and winter. Three black bears and 5 sheep were sighted. A large glacier was sighted about 8 miles south of camp and 3 miles east of the Chicaloon.

With fair weather on the following day we made 5 miles to where the trail leaves the river and runs over to the pass to the Talkeetna. Camp was made in a bunch of cottonwoods, the last timber of any sort on the Chicaloon. The succeeding day I went over the pass toward the Talkeetna and returned to camp after a 30-mile tramp. I estimated that the trail from the camp to the Talkeetna covers a distance of 14 miles. In a week half a dozen men could lay out a trail over the pass, which would make easy work for heavily loaded animals. Dandelions were in bloom in the pass.

The Talkeetna has its source in an immense glacier. The stream flows north 5 miles, thence northwest about 20 miles, where it turns sharply to the southwest. Two days later the sergeant and Private Ayers obtained caribou meat, it being altogether the poorest wild meat I have ever eaten, as it was watery and lean. I found the Chicaloon Glacier of much greater magnitude

than I had expected. The lower end is about a mile south of the camp, whence it extends up the mountains 7 or 8 miles, being from 500 to 2,500 feet in width. At the lower end it seemed to be 200 feet thick. It lies north and south, with an offshoot about 2 miles up, which extends for some 3 miles up a steep canyon to the left. It presents a massive and imposing appearance. Some fine-looking quartz containing iron and copper pyrites was found. "Talkeetna" is said to mean plenty of food and provisions. The valley is well stocked with game, fish, and wild fruits.

It now rained continuously for two days. Old prospectors told me that there is over a month of clear weather later in the season, during which time explorers and prospectors can accomplish more than during the balance of the year. Taking advantage of the first clear day, August 19, we reached the Talkeetna after a tramp of eight hours, although the trail would permit of a much quicker trip ordinarily. The first half mile from the Chicaloon the grade prevents heavy loading, although with a little work it could be adapted to a pack train. The trail runs northwesterly over a rolling country devoid of timber until the Talkeetna is reached. Here medium-sized spruce and fir are encountered. Caribou signs were seen in the reindeer moss, which everywhere covers the uplands.

A reindeer doe was killed the next day within 500 yards of the camp, which was located between the Talkeetna River and Clear Creek, immediately above their confluence. The Talkeetno flows from the south and Clear Creek from the northeast, each rising about 10 miles from our camp. The river bottom is broad and gravelly and is flanked with a considerable growth of spruce and fir. This spot is evidently a favorite rendezvous for Indians in the hunting season. A well-constructed caché and many old frames for stretching skins were seen. The point between the two streams contains about 160 acres, and forms an ideal camping spot.

I prospected on August 21, but failed to find a single color, which was a matter of surprise to me, as the conditions were most favorable for gold. The formation shows granite and porphyry, with good-looking quartz in the river bottom. I regarded this as a good field for prospecting, and regret that a more thorough investigation, from a mining standpoint, could not be made.

The fog prevented our exploring. On the next day I went up the river in the rain and examined the glacier. It is not as extensive as the one on the Chicaloon. I could not find an upper crossing to the river. The Indian claimed the trail was down the left bank, but from observations I regarded the right bank better for the pack outfit, at least for the first 25 miles. It cleared up on August 25, and I found the first 2 miles beyond Paradise Point (as we named the camp at the junction of the Talkeetna and Clear Creek) the most difficult. Below the camp for 5 or 6 miles the trail is easy either along the river bank or bottom. For 7 or 8 miles the river runs over a gravelly bottom that varies in width from 50 to 750 yards. When the water is concentrated the channel is never more than 100 feet wide. The swift current requires good judgment to select a crossing for animals. About 10 miles below Paradise Point a large stream flows in from the east. A small growth of aspen, the first on this side of the divide, led me to name it Aspen Creek. The mountains, 50 miles to the northwest, were seen to have long, gradual slopes, and at one particular point there is a very low pass, which seems easy of approach.

We returned to Paradise Point on the 26th instant, and on the following day crossed the pass and camped 5 miles down the Chicaloon. On the next day we reached Sergeant Mathys's camp at 8 a. m. Early August 29 we went down the river 18 miles. The animals made quick time on the back track. If we had displayed half as much energy getting into the interior as we did getting out of it, we would have accomplished more satisfactory results.

FROM CABIN CREEK TO THE VALLEY OF THE YUKLA, ALASKA.

By LUTHER S. KELLY.

I commenced my itinerary on May 20, 1898, and completed my journey July 1 of the same year. Cabin Creek, the point of my departure, is fed from a dead glacier that flows through a valley about 2 miles wide. In length this valley is about 3 miles. The sea front has a fine gravel beach and a sufficient depth of water for the largest boats that ply in Alaskan waters. It is in every way adapted for the location of docks and wharves. Good anchorage can also be had at this place, which also has a well-protected harbor.

I broke camp on the morning of May 20, as heretofore stated, with one companion. We proceeded in a northerly direction a distance of 6 miles to the summit of the pass, which was ascended with some difficulty on account of having to break a trail through the soft snow. The descent on the farther side was gradual. Leaving our packs in camp, we traveled on snowshoes 4 miles to a beautiful lake.

The mountains slope down to the edge of the lake, and on the right hand numerous snow slides occurred. The lake being frozen over, we proceeded on the ice to its foot. The lake is about 1 mile wide, and is fringed with spruce and heavy cottonwood timber. The outlet of the lake is a smooth-flowing, low-banked stream 30 feet wide. Proceeding northeast 1½ miles through the cottonwood timber, we ascended a dead glacier which gave us a good view of the surrounding country. The valley from the outlet of the lake appears to be about 2 miles wide, is heavily timbered, and extends about 12 miles southwest to Turnagain Arm. Directly north of us appeared an opening in the mountains that promised an outlet to the country beyond, and to the main stream of Twenty Mile River, which was partly hidden by a spruce-covered ridge. May 22 we made our camp on Cabin Creek. No trails or other evidence of people having visited that section was observed.

Since making this journey a nearer and lower pass has been examined, which is to the left of the route traversed by us on this trip, via a branch of the Twenty Mile River, which enters the lake at a point farther down. This pass was noted before, but continuous fog and snowstorms had prevented us from making an examination of it. The ascent and descent of the pass, through the range from Portage Bay, does not present any great difficulty for establishing a practicable pack or wagon route, and I believe a railroad could be built over this route. The rock is a slate and easily worked, and there are no glaciers to interfere with a permanent route over this pass.

On May 29, in accordance with my instructions, I returned to Cabin Creek, to make further investigation of this route. May 30 and 31, with the aid of a detachment of four enlisted men of the command, we transported all our supplies to the vicinity of Lake Glenn. From this point the detachment returned to Cabin Creek, while Lampe and myself constructed a raft and with some difficulty freighted our supplies on it to the foot of the lake. Our main trouble was with the ice at the lower end of the lake, through which we had to hew our way for a distance of about half a mile. We established our base camp, near the foot of the dead glacier above referred to, on June 2. Next morning we started, with packs on our backs, over the glacier, intending to take a short cut due north, to the opening in the mountains I wished to examine. But the course we followed soon became so perilous, by reason of clear ice and crevasses, that we were compelled to drop everything except our snowshoes. We then proceeded via the spruce ridge to the middle fork or main stream of Twenty Mile River, up which we had fine walking on the gravel bars which ran 9 or 10 miles to the canyon at the foot of another glacier. This glacier rises abruptly, in a series of cascades, and, so far as we could observe, forms a solid glacier in the system to the north of Portage Bay and probably beyond. We were unable to get a satisfactory view of the pass, although we climbed up well on the mountains, so we returned late at night to our camp.

June 4 we moved camp to the mouth of the canyon, where for several days we were unable to pursue our work of exploration, and could not reach the summit of the mountain, 5 miles distant, on account of the continued rain and snow storms, accompanied by heavy fog.

On June 9, having moved some of our supplies from our base camp, we attained the summit of the pass with difficulty. Our trail was up a gradual rise, through timber, to the snow line. On reaching the summit we found a glacier. A trail can easily be found around it. From the summit we proceeded about 2 miles to a rocky point which gave us a splendid view of the country beyond. Due north, about 10 miles, lay an immense basin, which is very low, fringed and shut in by a high range of ragged peaks. This basin was nearly filled by a flat glacier, which formed a lake at its southwest extremity. The outlet to it appeared to be on the west side of the basin, which was 15 or 20 miles in width. With the glass, a wooded gulch appeared on the north side about 20 miles away, and this was the only sign of timber seen in this region of bare rock, ice, and snow.

Observing a rocky ridge to the left of the summit which extended toward the lake below, I determined to examine the west branch of Twenty Mile River, as it appeared to have a favorable pass opening upon this ridge. The country northeast of the summit to Twenty Mile River, as seen from that point and the higher points en route, is of the most forbidding aspect, forming an impassable barrier of glaciers and high mountains with their peaks protruding through the ice. Fresh trails of so-called glacial bears and wolves were seen there, but no other sign of life except marmot and a few ptarmigan.

The next few days were spent in returning to the forks of the river and working our way up the west branch. High water, which at this time flooded the streams, compelled us to work our way through tag-alder bogs and pass dangerously near snow slides. In consequence, we were unable to exceed 3 or 4 miles per day, besides which the heat and mosquito pest in all its fury assailed us. The main stream of this branch runs through the canyon, and the pass is impracticable on account of the glacier. In going up this stream we were forced to climb several snow slides in order to avoid side canyons which jutted out into the main stream. We finally crossed where a snow slide had formed a bridge. To the west I found a pass leading to Winner Creek, a tributary of California Creek, which appears to be the only available pass for a continuance of the route from Portage Bay to Knik Arm. From Lake Glenn the proper course is westerly, across the main stream of the Twenty Mile River, thence up the right bank of the west branch to the pass, over comparatively level ground, which required the cutting of some brush. By means of a winding trail, the ascent and descent of the pass is easy, as timber extends nearly to the top, and while the snow was very deep on the summit we found no glaciers nearer than 2 miles. The valley of Winner Creek falls gradually to California Creek, a distance of about 8 miles, from which point I saw a favorable pass up Crow Creek, which I was unable to pursue at this time by reason of a shortage of provisions, which compelled me to return to the main camp at Ladds Station.

On May 22, in company with Mr. Mendenhall, I crossed Turnagain Arm in a small boat, took up the trail from the point I had left it, and proceeded to the summit of Crow Creek, where I found a favorable pass, with fairly good traveling and gradual ascent, the descent on the other side not being difficult to Raven Creek, which runs due north for 7 miles to Yukla-hitna River. A trail can easily be worked down the right bank of this gulch. The distance from Winner Creek to Yukla-hitna River is about 13 miles, and the altitude of the summit of Crow Creek, as determined by Mr. Mendenhall, is 3,760 feet. We descended to Yukla-hitna River from Raven Creek down an easy slope of ground covered with spruce and birch. At the foot the valley opened broad and smooth, bordered with numerous parks and groves along its edge.

A magnificent glacier blocks the upper part of the valley, at a distance of 2 miles, rising to a height of several thousand feet in 10 miles, and changes its direction to the right behind a ragged range of mountains. The contrast of green verdure close to this glittering mass of snow and ice is very pleasing. For several miles the river bed splits into numerous channels and fills the valley of the Yukla-hitna, though it is easily forded. The course of the stream is nearly northwest to the Knik Arm, a total distance of 33 miles.

This valley is one of great beauty, well timbered and walled in at its upper extremity by bold, and precipitous mountains that round off gradually into a low, flat country as the Arm is approached. Our provisions giving out prevented us from making a close observation of the

country, especially as a dense smoke from forest fires hid the lower valley and surrounding hills. There does not appear to be any material obstacles in the way of making a practicable trail, or wagon route, down this river. In order to reach the head of Knik Arm, it would be advisable to leave the Yukla-hitna River at a point 6 or 8 miles above its mouth and skirt along the foot-hills. But this we were unable to do for reasons stated above.

I consider the route traversed from Portage Bay to the Knik Arm a practicable one. As to whether the heavy snowfall in winter in the divide will block travel for animals remains to be proven by actual trial, but should a trail once be established and be kept open by travel, I believe it would be all right.

I was led to examine the route traversed, as well as other passes to the westward, by reason of the impracticability of the route via the head of Twenty Mile River.

A STORY OF HARDSHIP AND SUFFERING IN ALASKA.

By Lieut. J. C. CASTNER, Fourth Infantry, U. S. A.

It was almost perfect weather April 20, 1898, when 14 members of the Exploring Expedition No. 3, with the necessary impedimenta usual to such a trip, embarked on the steamer *Salmo* at Valdez, for Portage Bay, Alaska. As we passed the mouth of Eaglek, Makquik, and Port Wells, arms of Prince William Sound extending to the north, the water seemed filled with porpoise and the air full of ducks, geese, and gulls making their way to the breeding grounds in the far north.

As we crossed the mouth of Port Wells we could see the immense Barry Glacier—a live one—at the head of an arm of this bay. We reached the head of Portage Bay about 5 p. m., the distance from Valdez being estimated at 100 miles.

At the head of the bay and foot of the glacier, between it and Turnagain Arm, which is a part of Cook Inlet, we found several of that army of gold seekers who invaded Alaska in 1898. They were engaged in hauling their provisions, camp effects, etc., over the glacier to Turnagain Arm. About a mile from the head of the bay we found an available camping ground. We put two tents up in the snow, which was from 5 to 10 feet deep, and slept in them on the night of the 20th. The next morning I left the steamer to awaken the sleepers. They all appeared to have heavy colds. We breakfasted at once, and worked hard until 2 p. m., when the impedimenta was all ashore and the tents pitched.

We spent the next two days in exploring the upper part of Portage Bay in a small boat. Many varieties of waterfowl gathered here previous to their flight over the glacier to Cook Inlet country. On the morning of April 24, Captain Glenn, with the remainder of the expedition, arrived.

On May 6 I proceeded with a small party on the steamer *Pacific* to Port Wells to investigate the small stream called by me Whale Creek, which gave promise of leading to a divide, and possibly into the interior. Long before we reached the mouth of Whale Creek we saw that our mission would be fruitless. Great snow-capped mountains, 8,000 to 10,000 feet high, inclosed the head of the sides of Port Wells.

No trail could be made into or through such a region. Glaciers abounded between the lofty snow-capped peaks. Nature had placed an insurmountable barrier of snow and ice between the seacoast and the unknown interior. Here, as elsewhere on the coast of Alaska, nature more than defies the power of man to surmount the obstacles she places in his path. On a former trip I had climbed the right-hand glacier at the head of Port Wells, and from its summit looked far into this region. The glacier was apparently a relic of the glacial period, for, though of great extent, only a few streams flowed out of it. Its ice and snow seemed perpetual. The climb to the summit of this glacier permitted us to view its interior. As we broke trail on our snowshoes up the steep incline of snow and ice between the mountain side and the side of the glacier, we could see great masses of ice and rock thrown and piled together in every conceivable position. The lower masses of ice were almost as dark as the rocks about them. They had been traveling

neighbors for centuries, and had been ground down and carried along by billions of tons of their younger fellows above. We narrowly escaped several snow slides while indulging our curiosity about the make-up of glaciers.

On the afternoon of May 6 we returned to the mouth of the arm of Port Wells, which the Barry Glacier heads. We went up this inlet to within half a mile of the sea end of the great glacier. Photographs were taken and the interesting manufacture of icebergs watched. The latter consisted of the breaking off and tumbling into the sea of tons of blue ice from the face of the glacier, which was accompanied by the roar of a Niagara, as the berg started on its ocean voyage, eventually to melt and become a part of the tides which carried it away.

On May 10 I left camp at Portage Bay and proceeded over the glacier to Turnagain Arm and Cook Inlet, to secure guides for and information about the country at the head of Cook Inlet, to find a camping place on the same, and to sketch the country visited. I had one companion, a civilian. We had little difficulty in crossing the 5 miles of glacier which prevents the Kenai Peninsula from being an island. Snowshoes were only necessary the first 2 miles, after which the hard-frozen trail held our weight. Many glaciers entered the one we crossed; the largest extended for 20 miles to the southeast to the head of the false arm of Portage Bay. This is known as the Blackstone Glacier, named after the man who, with two companions, perished on it during the winter of 1896–97.

On May 13 I succeeded in finding a man ready to go to Sunrise. The tide rises and falls from 30 to 40 feet in this arm. It frequently comes in as a bore—that is, a wall of water from 2 to 10 feet high held back by the strong winds which blow down this arm. At low tide the country, which is part of the sea at high water, is uncovered for miles. A boat caught by a bore from 2 to 10 feet is almost sure to be swamped and its occupants drowned. For this reason Turnagain Arm is a very treacherous body of water, and one which few sailors care to navigate. It is inclosed between steep mountains, which are wooded to their summits. The tide-covered lands contain abundance of bad mires and quicksands.

I visited Quartz camp, which at the time of my visit consisted of about 400 miners, living mostly in tents. At Sunrise, on Six-Mile Creek, I found many houses and stores; the population is estimated at 800. A trail goes up this creek and across the Kenai Peninsula to Resurrection Bay on the Pacific coast. Another one goes up Bird or Indian Creek, emptying into the arm almost opposite Sunrise to Knik Arm. At Sunrise I met Messrs. Buckley, Davis, Perry, Spillum, and Hicks. The first four were of the only party of white men who had ever been, up to that time, to the head of Sushitna River. Mr. Hicks was the only white man who had ever been to the head of the Matanuska River. We reached Tyoonok May 22. It is situated on the north side of Cook Inlet, about 70 miles from its head.

On June 8, Mr. Hicks, guide; Corporal Young, Privates McGregor, Ayres, Woodruff, Evans, Powers, Fourteenth Infantry; Private Von Schoonhoven, Hospital Corps; Packer Dillon, myself, 4 mules, 1 horse, rations for seven days, tents, bedding, and cooking utensils, left camp at the mouth of the creek on Knik Arm, where we had landed by the steamer *Perry* on June 7, 1898, 2 miles below Knik Indian village, and started to find and establish a trail to Canyon Gulch, a tributary of Matanuska River, 90 miles from Camp Knik. It was on June 23 that we reached and crossed Granite Creek, and proceeded along the banks of the Matanuska.

We reached Chicaloon Creek June 29. The Chicaloon is a swiftly flowing glacial stream, and is the largest of the Matanuska's tributaries. It comes from the northeast for over 50 miles, out of the mountains between the Sushitna and the Matanuska rivers. We found a few fine gold colors and signs of copper on the bars. We reached Bowlder Creek July 2. On July 12 we were between 75 and 80 miles from Camp Knik, which distance we had made between June 8 and July 11. Almost every mile of the way we had been compelled to cut trail. The animals had been constantly on the move, having traveled close to 500 miles. We reached the foot of Canyon Gulch Hill on July 16. On July 27 we arrived at Caribou Creek, and subsequently struck Hughes Creek. This we followed to its junction with the Bubb. At Caribou Creek we found plenty of quartz rock on the bar. We continued down Bubb River on the banks and bars in a direction a little northeast. Here the river valley is broad, flanked with low brushy hills. On

August 3 we followed Bubb River to the east, and passed the mouth of a creek which entered the river from the south. The next day we traveled east down Bubb River and finally crossed to the south bank. We followed the south bank to where the river turns due south and flows into Lake Plaveznie, whose outlet stream, the Tazlena, flows into Copper River.

We were now about 165 miles by trail from Knik, and about 85 miles from our previous camp on Bowlder Creek, which we had left on July 26. If we could find as open a country to the front as that we had just passed over, and the animals held out, I felt no danger about reaching the Tanana. Twelve miles from our camp of August 6, we passed Lake Louise. The next day we passed numerous lakes. On August 8, after we had proceeded quite a distance on our journey, we were compelled to abandon the mules. We put part of the load on our backs and part on the remaining animals and continued due north for about 6 miles.

From our camp of August 7 we had a fair view of the country about us. As far as could be determined we seemed to be in a great tract of country, bounded on the east by the Copper River Valley, on the north by the Alaskan Range, on the west by the Sushitna River, and the mountains between it and the country north of the Matanuska. On the south it seemed to be bounded by the Bubb River and the Plaveznie Lakes with their tributaries and outlets. The country was cut up by numerous wooded ridges, from 100 to 1,000 feet in elevation, which ran in all directions, and were also cut up and separated by thousands of small lakes and marshes, which drained into the Sushitna and Copper rivers. The ridges were well timbered with spruce, fir, hemlock, birch, and cottonwood, and the marshes were frequently open. Both had been often burned over, making good traveling. The lakes were generally shallow and were breeding places of many ducks and a few geese and swan.

Signs of moose were plentiful and caribou were seen near Lake Louise. The large mountains, Wrangell, Sanford, etc., were visible across the Copper River. The range of mountains which runs nearly north and south between the Sushitna and Matanuska countries continues to the north between the Sushitna and the lake regions, and gradually gets lower and ends about 60 miles from the foothills of the Alaskan Range. Between the Matanuska and the Bubb rivers the country was mountainous, but the mountains were frequently isolated, and passes between them permitted movements in all directions. To the north could be seen the lofty Alaskan Range, running nearly east and west. Passes were visible at the head of Copper River, and almost north of us, and again to the northwest. Elsewhere the range presented a very rugged and glacial appearance.

On August 10, at 8 a. m., we left camp, going north toward the pass in the Alaskan Range, and over the same character of country we had passed during the last few days. After going about 6 miles we went into camp at 3 p. m., as the animals were worn out. Two of them could not be urged to move. At the end of each day's march it seemed the animals would never be able to make another mile. At the first appearance of mud they would give up and fall and have to be unloaded. After continued hauling and beating they were gotten out of the mire, loaded, and urged forward. This would happen from 10 to 15 times a day, until our strength and patience were completely exhausted. So slowly were we advancing that I had to order half rations, as it was impossible to judge what we had ahead of us.

On August 11 we crossed Stetson Creek and a mile farther on Andres Creek, both tributaries of the Gakona River. The latter is a tributary of the Copper. We had now reached the foothills of the Alaskan Range, and found a good Indian trail going up the Gakona River. This trail we followed up the course of Andres Creek. We crossed Andres Creek and soon struck the Indian trail to the northeast. The trail soon forked. We took the trail going to the northwest, which led to the Sushitna and lower Tanana.

On August 16 we reached the Tanana side of the divide and were assured by the Indians that we would reach the Tanana River in about two "sleeps." On the next day we crossed the Duncan River and proceeded east of northeast down its bank. The Duncan River, at the time we crossed it, was almost one continuous lake. Coming from the north out of the mountainous tract, and joining it about 4½ miles from camp, was Gregg River. We were assured by the Indians that on the morrrow we would reach the Tanana River.

Winding between lakes we left Duncan River, turned to the north, and soon reached an elevated ridge, which the Indians told us was a divide to the Tanana River. We followed up the creek coming down the ridge, passed a lake over the summit, passed another lake and followed its outlet stream down the lake on the north side and went into camp near the Delta River. We believed the Tanana was only a few miles distant, as the Indians had informed us. The Delta River comes from the southwest out of a mountainous glacial region, and the Duncan River empties into it about 3 miles above where we camped. Coming over the ridge we met an Upper Copper River Indian hunting caribou, who informed us that there was a camp of Indians on the river a short distance from our camp. Still believing that we were near the Tanana, I discharged the Indian who had been hired to pack to the Tanana. The one whom we had engaged at the Upper Lake Plaveznie continued with us, with the understanding that he was to get my shotgun if he helped us to reach the Yukon. I engaged the Indian whom we met hunting caribou to help us to reach the Yukon.

The next day we met some Upper Copper River Indians, who seemed to enjoy our ignorance with regard to the geography of the country and about which they told us many lies. From the hills we could see far to the east and west the rugged snow-capped peaks and glaciers of the Alaskan Range. The Delta River cut through the range in its course to the Tanana. Many glaciers terminated at the river bank.

Captain Glenn arrived the evening of August 25. Having fresh animals, which were obtained from Captain Glenn, we proceeded on our journey. For three days we traveled in a northeasterly direction, and August 29 the party divided. Some members of the party went back over the trail to await the return of Captain Glenn from Tanana. The Tanana party left camp about 10 a. m., going north of northeast, and after traveling about 15 miles went into camp. The next day I broke camp with orders from Captain Glenn to proceed to Circle City, and from thence to Vancouver Barracks, Washington, accompanied by Privates Blitch and McGregor, Fourteenth Infantry. We reached the Tanana River in the afternoon of the same day, at the point where the Delta enters that stream by six channels. Up the high south bank of the Tanana was a well-traveled Indian trail, but for 4 miles and more above the cabin the river was divided into several channels by numerous islands. The best place to cross we found opposite the Indian cabins. Without a single nail, and with the assistance of moose skin, we constructed a raft of four logs about 16 feet long and 1 foot in diameter.

After traveling for two days we discovered two white men on a raft passing the mouth of Delta River. Our shouts caused them to land on our side below the stream. With the aid of $2 we induced one of them, a Mr. Taylor, to come up and see us. He informed us he had come from Dawson by the way of Forty-mile, Lake Mansfield, Ketchumstock Hills, and the Tanana River. He had lost three rafts in timber jams and had been rescued from drowning three times by his partner. He had been up the Volkmar River 50 miles. As he found no trail on either side, he was on his way to Weare. He had no hat, coat, or shoes. I gave him a little tea and salt, of which we had plenty, and a message to Captain Glenn. He joined his companion and they watched us while we crossed the river. We landed on the island and then crossed the slough with all save the mule "Jack," who nearly upset the raft and had to be cut loose. The rain fell all day. After two hours' hard work we had to leave "Jack" on the island, for he could not be induced to enter the ice-cold water. We subsequently got "Jack" across the slough and after drying our clothing we traveled north of east through thick brush and timber along the bank of a slough. We climbed a steep hill to avoid the bluffs, and kept up on the hillside all the afternoon, crossing many deep ravines and gulches. Both of the mules seemed sick. The ice-cold glacial water gave them severe colds. Night and day they were shivering and seemed unable to keep warm.

On the next day I abandoned "Weyler" and left him to die in peace, putting his load in part on "Jack" and the remainder on our own backs. We were now on half rations. On September 5, after traveling a short distance, we struck the Volkmar River, about half a mile from the Tanana. Then we followed up the Volkmar for a distance of 2 miles, and passed its forks. The Volkmar enters into the Tanana by two mouths and is a very winding stream of

medium current, the water being swampy in color and taste. The river valley is from 15 to 20 miles in width, and the stream runs between woody hills that are from 500 to 1,500 feet in height. The trees along the stream are spruce, fir, pine, cottonwood, birch, alder, hemlock, willow, etc.

We killed eleven grouse in the evening, which helped out our small rations. On our journey the next day the river came from the south. The traveling this day was very hard. Our clothes and shoes were now in a wretched condition. On examination it was evident there was no trail up this river and never had been. The maps in our possession showed an open space between the Tanana and Ketchumstock Hills about northeast of the Volkmar River. Our course up to date seemed to be bringing us toward this tract which, according to the map, would give us easy traveling to Birch Creek waters, thence to Circle City.

About noon the following day, in attempting to ford the river to avoid its windings, I was swept off my feet by the swift current, and soon found my head under water. I lost my sketching case and my ax. I was thrown against a timber jam and stunned, but managed to reach the farther bank.

The mule gave us much trouble. On September 9 the mule fell three times in going 400 yards. About a quarter of a mile from camp he fell again on a steep hillside and rolled into the river, wetting all of our supplies. We dragged him out and shot him, as we needed meat, and could not afford to abandon him altogether. We took about 60 pounds of his flesh and all of the straps and ropes we needed from his harness, and with 50-pound packs on our backs we recommenced our journey. We were so weak that we could not go far. The covering on our feet was nearly gone. We were now making bread once in three days. One loaf was made to last six meals.

During our advance the next day we were compelled to abandon our blankets and many other articles. I realized we must reach Birch Creek and white men or Indians, or else we would be in desperate straits. It rained and snowed every day to add to our discomfort. We followed the windings of the very crooked river. We were unable to ford it on account of its depth and swiftness. On September 14 we made 11 miles and camped at the forks of the Volkmar River. The valley of the river had now widened. Gently sloping hills were on each side, the snow-capped hills being more distant. Many streams entered from each side, and the valley had every appearance of being a divide country. Between the forks one stream came from the southeast and one from the northeast, and there was a bald mountain 3,500 feet high which promised a good view from its summit. We had enough bacon left for supper and for breakfast the following morning. We had tea and coffee sufficient to last us about two weeks. We proceeded up the southeast fork of the river until we reached the summit of the mountain. Here we found that the southeast fork of the river divided about 2 miles above our late camp, one branch coming from the south and one from the southeast.

Whether we looked north, east, south, or west, all we could see were mountains 1,500 feet to 4,000 feet high, snow-capped and very steep and rugged. There was no sign of a divide or tributaries. We continued north of east all day over rugged mountains, hoping to see a way out, but in vain. With strength all but gone, we stood at sunset on the summit of a high mountain. At the foot of the mountain ran a branch of the northeast fork which found its source in a small lake lying in the crater of an extinct volcano. With powerful glasses I could see nothing but mountains as far as my eye could reach.

I knew we could not climb out of these mountains in a week, even if we possessed good health and strength and had plenty of food. In our present condition, without food, or strength, or shoes, our feet torn and bleeding, and no chance to find game, it seemed to me our only way was to turn back and go down the river. The trail back was the kind of walking best suited to our feet and strength. With gloomy thoughts I turned down the mountain into the valley of the northeast fork, and continued down it until dark. It was with reluctance that I turned back.

We had worked hard to get through and had gone long without food and blankets and had waded through glacial water. We had been frequently rained and snowed upon, and our feet were many times torn and bleeding. Our condition compelled me to abandon all hope of reaching Circle City. I was satisfied that the route up the Volkmar River was impracticable, and that no

trail had ever existed up that stream. The maps in our possession were very erroneous. Plotting our course on them as nearly as I could, it seemed to me we should have struck the south fork of Birch Creek long before we turned back. Since then I have learned that this stream has not half the length our maps gave it, and that it has an entirely different direction. Without a guide, acting solely on Captain Ray's report and the knowledge the maps gave us, I felt that we had already gone too far into this region, which is practically unknown and unexplored. The maps of this region would lead one to believe the makers of them were very cognizant of its geography. Such, however, is not the case. My experience before and since this trip up the Volkmar River teaches me that any individual who places his faith in any map of Alaska existing to-day will be badly deceived. I have positive knowledge that they were erroneously made in general features and the result of guesswork in details.

On September 15 all still water froze during the night. The next day we camped on the main Volkmar about 4 p. m. in a heavy snowstorm. Fortunately we had two little ducks for dinner. Breakfast the next morning consisted of a cup of coffee, after which the painful march down the river valley was resumed. It snowed, but was not very cold. A young wolf was curious enough to approach very close, and after repeated firing at him he was killed when not 75 yards away. The body was skinned and its flesh placed upon our backs when we resumed our march. We went into camp at 4 p. m. at the place where we had thrown away our blankets on the march up the river. The blankets had not been molested and we enjoyed a good night's sleep, the first in nearly a week. The wolf proved good eating; its flesh tasted much like mutton. On September 18, a few miles over mossy, swampy hillsides proved to us that we were trying to pack more than we were able to carry. A halt was made about noon to build a raft. This means of traveling promised better results than painful walking with heavy packs. Having no ax the roots were burned from four logs and the blankets torn up into strips for rope.

On the next day with this frail raft we embarked in a heavy snowstorm. The firearms and our scanty bedding were secured to the logs and our remaining food, tea and coffee, strapped in the bedding. We went with great rapidity through 5 miles of continuous rapids, under dangerous sweepers, narrowly escaping several timber jams. Soaked to the waist by the icy water, wet through above the waist by the falling snow, we were about to stop to warm our almost-frozen limbs when the swift current drove us into and under a large timber jam. I ordered McGregor to get on shore as quickly as possible. Blitch and I made a vain effort to secure the rifle or shotgun. We finally extricated our limbs from the tangled mass of roots with great pain and difficulty. The raft remained under the jam; having no ax we could not cut it away. Without food, firearms, shoes, coats, or blankets, we gathered around a fire of driftwood.

The distance of 10 miles to the dead mule was made in stocking feet, through icy swamps and over jagged rocks. What the ravens and wolves had left of poor "Jack" was unfit to eat. From the kyacks we secured some canvass for our feet. For six days we continued our painful march down the valley of the Volkmar, living on cranberries and rose apples. For breakfast we gathered around a rosebush; for lunch we rested near a cranberry patch; dined at 4 p. m. off another rosebush. Camp was made early to enable us to secure enough wood to keep from freezing during the night. Our scant clothing was almost burned off during the night by getting too near the fire in our efforts to keep warm. Without covering, we lay shivering in the snow. The pus-running sores on our feet closed at night, only to cause additional pain as we stumbled along next morning over the hard, frozen ground, which broke them open again.

Each morning found us weaker, our clothes more torn and burned, and our sores more painful. We had little to look forward to if nothing was to be found at the deserted Indian cabin at the mouth of the Volkmar. As my men often said, it would be impossible to make others understand what we suffered those days. No tongue or pen could do the case justice. On the 25th of September, when within a half mile of the mouth of the Volkmar, we heard the sound of an ax. Subsequently I often listened for the same sound at night while looking for a woodchopper's cabin on the snow-clad banks of the frozen Yukon. The first one to see us was a squaw fixing a birch-bark canoe on the bank of the Volkmar. She aroused the village by her shouts. Five bucks came running toward us, greeting us in the most friendly manner. We

were shown to a log house. Bear skins were stretched upon the floor to sit on. The squaws made a great jabbering while they prepared food for us. They needed no words to make them understand what we needed most. One buck spoke a few words of English, which he had learned at Circle City. We ate caribou, moose, and salmon, and drank plenty of tea. Two hours afterwards we ate again, and ate at intervals of two hours during the night, experiencing no discomfort therefrom. We spent the next day eating, resting, and trying to obtain information from the Indians. I succeeded in engaging three of them to go down the river in birch-bark canoes to an Indian camp 100 miles below.

The following day we secured a few articles of bedding, clothing, and some cooking utensils, and embarked on the swiftly flowing Tanana. We had to keep moving, as the Arctic winter was closing around us. We made about 50 miles, stopping three times to cook and eat. The mouths of Delta River and Delta Creek were passed and a long slough entered, which leaves the main Tanana and winds away to the northwest for over 100 miles before again meeting the Tanana. We camped on a river bar about 9 p. m., all huddling close together with feet to the fire to keep warm while we slept.

On September 28 we made an early start, and after traveling 50 miles we reached an Indian camp at the mouth of the Salchucket, a large river hitherto a stranger on the map. It comes about 225 miles from a little north of east and from out the country between the Tanana and the Yukon. Lieutenant Allen failed to see the mouth of this river when he came down the Tanana, as he went down the main river and through Bates Rapids, which the slough avoids. It is up this stream the Volkmar and Salchucket Indians go to Birch Creek and Circle City. The Indians who were camped at its mouth told me that white men and steamboats were up the Chena River.

The next day we continued down the Tanana. Our party was increased by four Indians from the Salchucket party. This day a large bull moose swam across the Tanana just ahead of us, and was killed by the Indians. The next day we reached the fishing camp of an old chief at the mouth of the Chena. Leaving Blitch and McGregor with these Indians, I went up the Chena with seven Tanana Indians in canoes to find the steamboats and white men. Having left my men our small supply of bedding, I had to sleep between four of these Indians to keep warm, as the nights were very cold. After three and a half days' hard work we reached the forks of the river, 100 miles from its mouth, and found the steamboats and 18 white men. Along the right bank of this stream a good pack trail could be cut, the ground being level and firm. The white men were much surprised to see one of their race. They tried to persuade me to stay with them all winter, fearing the rivers would close with ice before I could again meet white men. From them I secured a boat, rifle, ammunition, cooking utensils, clothing, thirty days' provisions, cough medicine for my Indian friends, and salve for our sore feet. Fearing they would get short themselves, they could not afford to sell me much for the Indians, whom I had promised to repay for their kindness when we met the white men. This caused the Indians to get very angry with me, as they could not be made to understand why I did not secure plenty of flour, butter, sugar, etc., for them when they could see it in the white man's possession with their own eyes.

On October 5 the white men gave three cheers as I left and backed my boat down the rapid stream so as to see the rapids and snags. The Indians treated me with sullen silence, paddling leisurely down stream in their canoes.

On October 6, in the evening, we reached the mouth of the river, going 100 miles in a day and a half. We found Blitch and McGregor anxiously awaiting a chance to eat some of the good things my boat contained. As I had overburdened my own stomach by eating too much bread, rice, beans, oatmeal, and dried fruits, I cautioned them. But the temptation was so great they also ate too much and were sick.

Leaving our sullen Indian companions October 7, we wound down the stream, feeling more like real men than we had for many days. Lieutenant Allen's map of the Tanana was found to be marvelously correct. We passed the mouths of tributary streams exactly where we expected to do so. The valley of the Tanana widened toward its mouth. The river was sometimes all in

one channel, sometimes in a half dozen. It flowed on the extreme north side of its valley. The valley had widened from 20 miles at the mouth of the Volkmar to more than 40 miles. Abundance of fine timber lined the banks of the main stream and its tributaries. Far to the south could be seen the towering snow-capped peaks and glaciers of the great Alaskan range. To the north the river turned constantly in its attempts to break through the hills and mountains on that side and join the mighty Yukon. Eight Indian villages were passed. They were generally located at the mouth of tributary streams. The largest, of twenty cabins, was opposite the mouth of the Tanana (Lieutenant Allen's "Cantwell") River. The natives desired us to stop, but we rowed from before dawn till after dark each day, never stopping until we made camp in some convenient bunch of spruce trees.

We expected to reach the Yukon at noon on the 11th of October. About 11.30 a. m. we started to cross the mouth of what seemed a large tributary of the Tanana coming from the northeast out of snow-capped mountains. It floated great masses of ice, and was about one-fourth the width of the Tanana. Expecting to find the Yukon flowing through a broad valley with a width at least as great as the Tanana, this stream puzzled me; but I concluded it was only another case of a large tributary missed by former map makers. We had difficulty in avoiding the large ice floes. When halfway across its mouth I noticed cabins and tents on the north bank, and knew we were at Tanana Station and Weare. A heavy sand storm across the large flats at the mouth of the Tanana had prevented us from seeing these tents and houses as we came down the stream. We had made 250 miles from October 7 to October 11. It was just 12 o'clock when we sat down at the table of Captain Mayo's son to eat in a civilized manner.

Early inquiries had caused us to be resigned to a winter in Alaska, for the last boat had passed Weare on its way down the river about September 10. We were the guests of Mr. Belt, the agent of the N. A. T. & T. Co. at Weare, from October 11 until November 1. During this period we ate plenty, rested, and looked after our feet. If we had been a day late in crossing the Yukon, we would have been compelled to have remained on the south bank until it froze over, as the stream was jammed with ice October 12.

On October 25 it was possible to cross on the ice. On October 30 the sores on my feet stopped running. On November 1 we started for Rampart City, 75 miles up the river. Here I expected to find Lieutenant Bell and 60 men. This time Blitch and McGregor dragged a sled carrying our bedding and provisions. We passed many cabins occupied by wood choppers, engaged in cutting wood for the steamers.

On November 5 we reached Rampart City, having camped out two nights and slept two nights in cabins. Rampart is on the south side of the Yukon, at the mouth of Munoock Creek. It has many stores and claims a population of 1,500. At Weare I had written most of my report. At Rampart I platted my trail roughly on wrapping paper. Turning Blitch and McGregor over to Lieutenant Bell, I began making preparations for a trip to Skagway over the snow and ice. While not in the best physical condition for a 1,300-mile trip in the middle of an Alaskan winter, I decided to come out and report. If I remained until the ice broke up, it would be August before I would be able to reach the States, and the knowledge I had gained would be useless to another party going in the following season. I relied on Lieutenant Bell's excellent judgment in purchasing and equipping seven native dogs and two sleds. Mr. W. J. Cram, experienced in the care and driving of dog teams, was engaged to accompany me.

We said good-bye to our friends at Rampart on the morning of December 9 and turned our faces up the mighty Yukon, whose frozen waters we were to traverse for 1,500 miles before we could reach Skagway and the seaboard.

On December 13 we reached Fort Hamlin, 80 miles up the river, just at noon. Here there were a few white men and Indians on the south side of the Yukon. Fort Hamlin marks the end of the flats and the beginning of the ramparts, which extend to Weare.

On December 14 we reached Dahl River, where 17 large steamers were wintering, all loaded and bound for Dawson. Here we outfitted for Fort Yukon, 220 miles away, taking provisions for fifteen days. There being no trail, we had to break one with snowshoes. The days were not two hours long. The snow was 3 feet deep. The river, a labyrinth of channels, was from 10 to

40 miles wide. The thermometer was 50° to 60° below zero on the 18th, 19th, 20th, 21st, and 22d. On December 18 we passed Lieutenant McManus, Third Artillery, 2 soldiers, and 1 Indian guide, from Circle City, going to Rampart to pay off the troops. This was the most difficult part of the journey over the ice. We went for sixteen days without a rest. The sores on my feet broke out again. The feet of the dogs were also very sore. I froze my right cheek and fingers on December 20, but not very badly.

On December 25 we rested in a wood chopper's cabin, of which there were many all along the river. Several cases of scurvy came under our notice among these people, the result of no bathing and no fresh meat or vegetables. I had a slight touch of scurvy myself. We passed the mouth of the Chandelar River, unknown to map makers, 25 miles below Fort Yukon. It is 250 miles long and comes from the northwest out of the mountains south of the Koyukuk River. By one mouth it joins the Porcupine before entering the Yukon.

On December 28 we reached Fort Yukon, in the Arctic Circle. Here we found about 100 white men, 150 Indians, several stores, and 2 steamers.

December 29, 30, and 31 were spent investigating a case of accidental shooting which occurred 9 miles below Fort Yukon. The miners seemed to think it was my duty to capture the supposed murderer, so I reluctantly took the initiative, for time was precious.

On January 2 we left Fort Yukon, reaching Circle City, 100 miles away, on January 5. We had a good trail all the way. Here we found Captain Richardson, Eighth Infantry, and 80 men. The town claimed 800 population. It contained many stores, being the oldest mining camp on the American Yukon. The diggings are from 65 to 90 miles from town, on tributaries of Birch Creek. I met here Mr. Colombe, the leader of the only white men who have crossed from the head of Birch Creek to the Tanana. It took his party of 9 men and 11 horses over forty days to reach the Tanana from Circle City, something we tried to do, with about twelve days' rations, by going up the Volkmar. They experienced great difficulty, encountered many obstacles, and suffered considerable hardship. From the head of the middle fork of Birch Creek they traveled far to the east for many miles, avoiding the rugged peaks at the head of Volkmar River, into which I was unfortunately led by false maps and reports. They struck and followed down the Goodpaster, which enters the Tanana 70 miles below Volkmar. They lost most of their animals before reaching Circle City. Two winters ago a party of 7 Tanana Indians starved to death while attempting to reach Birch Creek from the head of the Salchucket. Last winter a party of five all but perished, being rescued from Circle City after having eaten their snowshoes, moccasins, and dogs. Evidently this would have been our fate had we plunged into the mountains of volcanic rock from the head of Volkmar River. Weak as we were, without shoes, food, blankets, or a prospect of killing game, our chances of getting through were very poor. Mr. Colombe believes a good trail can be made up the Goodpaster to Birch Creek and Circle City.

On January 8 some one stole a dog and chain from us. Reluctantly we left Captain Richardson on January 10. The thermometer at the front of his log cabin registered 49° below zero. Twenty miles above Circle City the great Yukon flats end. The river at this point comes out of steep wooded hillsides, from 500 to 2,000 feet high. Having turned in our tent and stores to Captain Richardson at Circle City, we had to make a cabin every night or sleep in the snow.

On January 16 we reached Eagle City, having passed settlements at Charlie River, Ivy City, Nation City, and Seventy Mile. At the latter place there are about 200 miners. Many more are up Charlie and Seventy Mile rivers, whose sources and lengths are erroneously mapped.

On January 17 we rested at Eagle City. It has the best town site on the American Yukon, and claims a population of 1,000. Most of the mining at present is on American Creek, a tributary of Mission Creek. The latter empties into the Yukon at Eagle City. This is the last town on the American Yukon, the boundary being 11 miles above. Miners have a trail up Mission Creek and its tributaries to Forty Mile Creek.

On January 19 we reached Fort Cudahy and Forty Mile, located on opposite sides of Forty Mile River, on the south bank of the Yukon.

On January 20 we rested at Cudahy. We found here the first Northwestern mounted police post, consisting of a sergeant and four men. They are not mounted on the Yukon or its tribu-

taries, save at Tagish Post, the headquarters. They are neither police nor soldiers—a little of both. They have the best equipment as regards clothing that I saw in my journey. They seem indispensable in the country they police, and are uniformly kind and courteous to all. Their posts are scattered along the Yukon and its tributaries from Fort Cudahy, Yukon territory, to Log Cabin, B. C., which is 15 miles from the summit of White Pass, or 35 miles from Skagway and the seacoast. The posts are not more than 50 miles apart, usually less. They are garrisoned generally by one sergeant and four privates.

On January 22 we reached Dawson City, 330 miles from Circle City. We made this distance in eleven traveling days—thirteen days counting rests. Dawson is located on the north bank of the Yukon, at the mouth of the Klondike River, which comes from east and north of it, out of elevated, timbered hills. The city claims a population of 16,000, and with the people on the creeks 30,000. There are about 100 regular Canadian troops here. At the time I arrived there it boasted of electric lights, good hotels, theaters, telephones, and stage lines to mining camps in the vicinity. Plenty of fresh beef could be had at 15 cents a pound. I intended to rest five days in Dawson, as my feet and the dogs' feet were blistered and very sore from pounding the hard, frozen trail. While in Dawson we saw the cinematograph bombardment of Matanzas by the American fleet.

On January 25 we again lost a dog and chain. Our dogs were among the few interior or native dogs on the upper river, and the envy of all travelers. For this reason we were constantly in danger of having all of them stolen. I spent until February 1 hunting for this dog, assisted by the Northwestern mounted police of Dawson, but in vain.

On February 1 we said good-bye to Dawson and started out over the cold trail for Skagway, 600 miles away. We reached Fort Selkirk February 7. It is garrisoned by 400 regular Canadian troops, under orders to move to Dawson in the spring. It has about 200 population, exclusive of troops, and is located at the head of the Yukon River, at the junction of the Lewis and Pelley rivers.

On February 8 we rested at Fort Selkirk, having come 180 miles from Dawson in seven days. In this journey we passed the mouths of Indian, Sixty-Mile, Stewart, White, and Selwyn rivers.

On February 9 we started once more for the coast, now following the frozen waters of Lewis River.

On February 15 we reached Hootalinqua, at the head of Lewis River, and at the junction of the Hootalinqua and Thirty Mile rivers. We rested there one day. Seventy-five miles above Fort Selkirk are the Finger Rapids. Four immense rocks break the Lewis River into five channels. Between Fort Selkirk and Hootalinqua are the mouths of Big and Little Salmon and Casier rivers.

We left Hootalinqua and followed up the Thirty Mile River. This stream proved a stumbling-block to many Klondike gold seekers in 1897. More lives were lost on it than on any other stream in this region. It is open in many places in winter. Several portages were made to avoid its snake-like windings. At its source the country assumes a divide appearance. Numerous lakes and gently sloping hills told us that water would soon be flowing away from us, and we would be going downhill to the sea. On Lake La Barge, at the head of the Thirty Mile River, we encountered a severe wind and snow storm. In the same storm eight miners perished on Lake Atlin, a neighboring body of water. As we had the wind with us, we let it blow us across the 36 miles of frozen lake up into Fifty Mile River. I do not believe any mortal thing could have faced this storm. Eighty-five miles above Hootalinqua we went around the famous White Horse Rapids by a well-established road, striking the river again above Miles Canyon. Here a tramway 4 miles in length permits the gold seeker to transfer his impedimenta along the rapids. Steamers run from the foot of the rapids to Dawson and from Bennett City to the head of the rapids.

We reached Bennett City at the head of Bennett Lake on January 23. From here the trail winds away from the water courses and lakes, climbs the divide to the summit, then crosses and recrosses the wide pass of the Yukon Railway, now under process of construction. Seldom does it not storm on these passes. It would have been impossible for us to have crossed had the trail

not been marked by numerous spruce trees at short intervals. At 4 p. m. we boarded a railroad train on the summit of White Pass and rode down the 20 miles of wonderful railway to Skagway. This road winds for miles over the ice-bound canyon of the Skagway River, along the base of precipitous bluffs and more than 1,000 feet above the torrent. Far down could be seen the sled trails to the summit. Many small, black dots were visible on the white surface, meaning that another army of gold seekers was on its long, perilous journey into the wilderness from which we were emerging. How many, many had gone before that time, filled as were they with radiant hopes; but it was safe to say that very few would realize them. The chance of winning the prize is not worth the hardships and toil required to get it. As we went bumping along this odd railroad, I felt for the thousandth time since I turned my face back from the ragged, rocky peaks at the head of the Volkmar, that I was going home. This means more to the wanderer than I can tell.

On February 25 we reached Skagway at 8 p. m. The next morning I went over to the Government reservation below Dyea and met Capt. R. T. Yeatman, Fourteenth Infantry, who had 50 men of his company with him. He kindly received the dogs, sleds, and other Government property which it would be useless to take to the States with me. Regretfully we parted with our true and tried friends, the dogs. At 5 p. m. we sailed from Skagway on the steamer *City of Seattle*, reaching Seattle, Wash., and Vancouver Barracks on March 1.

TRANSPORTATION.

In a country so little known and offering so many natural obstacles and hindrances to travel, the transportation of the necessary impedimenta of camp life has been a difficult problem to solve. The exploration of the coast line with small steamers was an easy matter. As soon as we started across the country, locating and cutting out our own trail, many difficulties relating to transportation were encountered.

If a sufficient number of pack animals were available, and enough men at hand to level all brush, build all bridges, corduroy all swamps, and escarp all inclines, travel would be rapid in Alaska.

My experience leads me to the conclusion that, all things considered, a hardy, well-built, big-footed horse is about as good an animal for summer use as can be secured. No doubt the mule is more hardy, but his small feet makes the abundance of marsh land a great drawback to his use. Each animal can carry about 200 pounds.

The interior Indians pack small amounts (10 to 40 pounds) on their dogs, using two canvas pouches thrown over the dog's back and secured around the base of his neck and around the stomach by straps of canvas. This contrivance could possibly be used on some of our larger dogs.

Whether mules or horses are used, protection to the ears should be carried to help them against the ravages of the mosquitoes and, worst of all, the white-legged fly. The latter on one occasion caused me to go into camp at once and make covering for the animals' ears.

On a hard, well-beaten winter trail the horse can be used under certain conditions to great advantage. Hundreds of horses were worked on the trail from Dawson City to Skagway, 600 miles, during the past winter. The principal objection to the horse in winter is the same which applies to the dog in summer, viz, the carrying of food. If stations were established with plenty of forage, the horse could be used advantageously in winter, as his food means much bulk and weight on a sled. For winter travel the interior, or native, dogs are the best. Unfortunately, their supply seems limited. The Herschel Island dog, from the Arctic Ocean, is perhaps the best, counting on his great size, great strength, and his wonderful affection for man. There is something noble, yet pathetic, about their lives. Gladly each morning they stand with wagging tails while the cold, frozen harness is clasped about their necks and sides of fur. All day long and well into the night they work, work, work, pulling the heavily loaded sleighs, now over good, smooth ice, now up and down over hummocks. Hard blows and harder words are usually their portion, and at night a frozen fish and a bed of snow and ice, while the thermometer may

range 60° below zero. Always faithful, always ready to pull for all there is in them, kind and affectionate to man, it would seem they deserved a better fate.

The Husky dog, of the Upper Yukon and Tanana, is the next best dog. He is smaller than the Herschel Island dog and not so willing to work. After him comes the Malemute, from the Lower Yukon, with his foxlike head, ears, and face. He is the smallest dog of all, but is larger than our setters. They are the least affectionate and useful to man. Still they are better, all things considered, than our outside dogs. On a fair trail an average dog can pull 150 pounds on a sled. We had one Herschel Island dog that could pull 500 pounds on a good trail.

The sleds used are basket, built to a height of 18 inches to 2 feet, or the flat Yukon sled. Through heavy snow, without a trail, the toboggan is the best. The basket sled carries more stuff, and more securely, than the flat Yukon sled, but is more easily overturned on inclined ice. Steel runners are a tremendous drawback in very cold weather and deep snow. The runner sticks to the snow as one's tongue would to cold steel. The wooden runner is the best for all purposes. The usual harness of the dogs consists of a leather collar with traces attached, which are secured by a surcingle about the dog's middle, and clasped by snaps to rings in the harness of the next dog in the rear or to the sled itself. As food the interior dogs prefer dried fish, but will eat bacon alone or cooked with rice, flour, oatmeal, or corn meal. Fish is the best food, and weighs least.

Some form of folding canoe or canvas boat would be a great help in crossing large streams. The Indians use the birch-bark canoes in navigating them. I rode 400 miles in one, but did not feel very secure of my position. It seemed like taking a voyage in a peanut shell. The Indians are very expert in handling them. The Peterborough canoe was used successfully by several geological parties in Alaskan rivers last summer.

My experience with rafts will not permit me to recommend them. Without tools or rope, our efforts were bound to give poor results. Every party should be supplied with a 1½-inch bit. A wooden handle can be made easily. The great rapidity of current, the numerous sweepers, rapids, and timber jams of Alaskan streams make rafting very dangerous. If one must be used, it should be as substantial as possible. A good form of raft, for three men with impedimenta, can be made out of five logs 20 to 24 feet long and 8 inches to 1 foot in diameter. At least three strong cross braces should bind them securely. A sweep, in a wooden lock, at each end will best propel and steer them.

The least desirable form of transportation for man is the earliest, loading his worldly goods on his own back. Many varieties of packs are used by the soldiers of different nations. The Merriam pack, invented by Brig. Gen. H. C. Merriam, U. S. A., is as good as I ever carried. It combines lightness, stability, simplicity, and adaptability. Much can be carried in a secure form. The greatest misfortune to the pack carrier is to have an apparatus which will permit him to lose anything. A man never carries very far on his back what he does not absolutely need, and to lose one of these articles, which it is impossible to replace, is often a serious misfortune. One must try the various ways of carrying a blanket-roll pack before he can determine which suits him best. A sled is best and easiest dragged with a broad strap over the chest and under the arms. One hand helps to hold it in place, the other should hold the indispensable gee pole.

The reindeer is condemned by all who have tried to use him on the Yukon.

GAME.

Alaska is not so plentifully supplied with game as most people imagine. It is a country of great extent. Many large tracts seem devoid of game entirely, and are as perfect a solitude as one can imagine. Each summer thousands of waterfowl and song birds pay a visit to this northern country, rear their young, and then all go south again. Among them I noticed many varieties of duck—canvasback, redhead, mallard; green-winged, blue-winged, and cinnamon teal: butter-ball, gadwell, widgeon, ruddy, golden-eye, and many others.

The coot family has innumerable representatives. The heron family is present. Canada, gray, Hudson Bay, snow, and other varieties of geese. Swan also are to be seen. The snipe family arrives early. It is comprised of the big and little yellowlegs, marlin, curlew, willet, jack, robin, and ox-eye snipe. There are also to be seen golden, black-breasted plover, and even Bartram's tattler, the upland field plover. Gulls, loons, and mergansers are plentiful. Many of these waterfowl stay all winter along the mild south coast of Alaska. I saw young mallards on the 6th of June, near Knik Arm, and half-grown jacksnipe in the passes of the Alaskan range on August 16. Song birds are plentiful. The robin redbreast, painted robin, catbird, and brown thrush sing all the long summer days. Besides these, redheaded, golden and red-shafted woodpeckers, kingbirds, hawks, and larks come and go, with many other varieties of birds. Over all sweeps the mighty bald eagle, who, year after year, comes back to these vast wastes to rear his young and scream defiance to beast and bird. All these birds are migratory. The ice-and-snow-bound Alaska never sees them. Her winter inhabitants are few. The most often seen is that cunning scavenger, the raven. Winter and summer he is present. Let blood flow, and he seems to drop out of the clouds to claim his share. The ptarmigan, or white grouse, in winter, brown in summer, is a constant resident of Alaska. He moves about in winter, unlike several other varieties of Alaskan grouse. The latter seek the center of some dense spruce tree and eat the branches all winter. There are a few small snow-birds that winter in the interior, and, besides those mentioned, are the only birds that remain after the snow comes.

Of the small four-legged creatures I noticed little red squirrels, porcupines, small big-footed rabbits, muskrats, beaver, marten, mice, badgers, whistling jacks, ground squirrels, and others which I can not name. The whistling jack resembles the ground hog, and derives his name from the sharp, warning whistle he gives to his fellows when he disappears in a hole in the rocks at the approach of danger. They are good eating. The small rabbit seems almost extinct south of the Alaskan range. Their great, broad feet permit them to run easily over the fine, powdery snow of the interior.

The large game consists of bear, moose, caribou, sheep, goat, lynx, foxes, wolves, and wolverines. Deer are reported plentiful on the extreme south coast and islands. The Indians rely principally on the moose for food, which is found in almost every part of Alaska. I saw the tracks of perhaps a thousand moose, yet they are so shy, so quick to discern your presence, I never saw but one live one. They are more easily secured in the mating season, October, and when the snow is deep in the late winter and early spring, February and March. Their principal food in winter is the willow bark, and in summer this bark with the leaves of small herbs. They keep in the marshes and river bottoms in summer, and in winter in the protected and secluded gulches.

Next to the moose the caribou, smaller in size, is most sought for its flesh and skin. It roams wherever the arctic moss, its principal food, grows. It is more of a traveler than the moose, moving southward in great bands in the fall. It is most easily seen frequenting the hilltops above timber line, where the moss is plentiful. Most white people prefer its meat to that of the moose.

The bighorn sheep inhabits certain mountain ranges. He is plentiful along the Matanuska River and in the main Alaskan range. He is at least half as large again as our domestic animal, and is good eating. The Indians use his flesh for food, his sinews for thread, his horns for spoons, and his skin for a bed. While he is wild and shy, he does not fear being seen. He feels secure, far up in the crags, from his natural enemies, the bears and wolves, not counting on man and his rifle. Goats are not plentiful anywhere, but a few have been killed in the great mountains south of the Matanuska River.

The principal bears are the large brown bear and the small black one. I saw the tracks of hundreds, but never saw a live one. The brown bear, judging from its skin, is an immense animal. He is very shy. According to report he is most ferocious when wounded. The small black bear is most plentiful, but not so fierce.

There are two kinds of wolves, the black and the gray. None of the former were seen by

me, although abundance of tracks were visible. I saw four of the latter and had the pleasure of eating part of one. They are very large animals, frequently measuring 7 feet from end of nose to root of tail.

The wolverine, judging from his antics, enjoys a joke. Many caches are torn open by them and their contents destroyed, although not edible. He is reported to be fearless, but we were never fortunate enough to see one. Lynx are plentiful in the river bottoms, but since their principal food, the rabbits, have disappeared south of the Alaskan range they, too, have moved north.

The bear, wolf, fox, wolverine, and lynx are scattered all over the country. To the far north, near the Arctic Ocean, the musk ox is supposed to exist.

TRAILS.

The trails of Alaska are inferior at best. The country has been crossed so seldom in any direction by white men, save in a few portions near the Pacific coast, that the establishment of a clear-cut, well-defined trail has not been possible. In that portion of Alaska traversed by myself I found no continuous trail going from any one point to another, even between places less than 20 miles apart. I do not include in this the winter trails over snow and ice. They are not permanent, and do not exist at all in summer. There are so few Indians, and they travel so little, that practically no trails worthy of the name are made by them. Consequently in the narrative of events from day to day, when trail is mentioned, it is meant one located, established, and cut out by ourselves alone. If a game trail is followed, it is mentioned. The latter is by far the most numerous throughout the country. The large game, in moving from one locality to another, has succeeded in wearing narrow paths in all directions. At some points these trails are very distinct; at others lost entirely. Where they are distinct the topography of the country is responsible, having made all the animals walk over the same ground, as between canyon walls, or on narrow necks of solid ground between lakes and marshes, or, again, along the banks of larger streams. The game trails start from nowhere in particular and go to nowhere in particular. Frequently they were found for short distances where we wanted to go, and were broadened and followed by us.

We cut out and established a trail from Knik Arm across the Tanana River to the head of the Volkmar River, which trail extended about 460 miles. The portion of the trail beyond the Tanana River is not practicable, in my estimation. After crossing the stream we had a succession of steep gulches to cross for nearly 10 miles, then we struck the Volkmar. About 25 miles from its mouth this stream sweeps from side to side of a narrow valley, cutting out bluffs, and compelled us to climb hillsides repeatedly. The hillsides were almost as nearly perpendicular as the bluffs themselves. No trail could be made to the source of the Volkmar without immense labor. From its source one would require wings to successfully cross the very steep, high, and rugged masses of volcanic rock which extend for at least 30 miles in all directions. From reports, the Goodpaster River, which empties into the Tanana from a little north of east, about 70 miles above the Volkmar, affords a way to Birch Creek and Circle City. Our trail down the Delta River could be turned off northeast about 25 miles from the junction of the Delta and Tanana, and, cutting across the wide valley of the Tanana, strike the river opposite the mouth of Goodpaster. From my own observations and the reports of miners, I think this is a very possible way to Circle City. The Volkmar Indians go west 100 miles to the Salchucket, and up it to Birch Creek, on their way to Circle City. The Chena Indians go up this stream to Circle City.

I met miners at Weare who came over the Valdez Glacier to the Tazlena River, a tributary of the Copper River. They followed up the Tazlena to Lake Plaveznie, and from thence to Upper Lake Plaveznie; thence to Lake Louise, and down its outlet stream due north for 60 miles to the left-hand fork of the Sushitna; across it to a low pass and from thence to the Tanana. They came near starving to death, being rescued by the Tanana Indians at the village across from the mouth of the Tanana, which point is 165 miles from Weare and the Yukon.

I met miners at Weare and elsewhere on the Yukon who came up Copper River and down Forty-Mile to the Yukon. One man came this way into Dawson City with a horse. Indians go from Rampart City, at the mouth of Munoock Creek, on the Yukon River, up Munoock Creek and over the divide to Baker Creek, and down it to the Tanana.

Good sketches of Munoock Creek, Hess River, Salchucket and Chena rivers have been obtained.

Miners go from Weare across several series of ridges to the Tozikakat. A sketch of the route up Dahl River to the Koyukuk has been obtained. A geological party has accurately mapped Birch Creek and its tributaries. Another geological party, under Mr. Bernard, this year mapped a tract of country, a degree of latitude by a degree of longitude, in which Eagle City is located. An old resident of Alaska, Mr. Chapman, has a good map of the Koyukuk country, which he would not permit me to see, but which, he said, had been sent to the War Department, in Washington. The oldest miners in that region claim it is the best map of the Upper Koyukuk existing.

Most of the travel by trail in Alaska is done in winter over the snow and ice. One can carry loads on a sled much easier than on one's back. The dogs of this country can be used best at this season of the year. Travel is confined mainly to the beds of streams or over the glaciers of the coast country. Trails elsewhere made are kept open with great difficulty on account of the drifting snow. We found a good trail up the frozen Yukon and its tributaries, from Fort Yukon to Skagway, a distance of 1,000 miles. From Rampart City to Fort Yukon, a distance of 300 miles, we were compelled to break a trail through the snow, which was from 18 inches to 3 feet deep. A trail across country in winter will be a most difficult thing to keep open.

Without having experience it would be difficult to make one understand the hard work, danger, and difficulties one must encounter in crossing any pass or glacier in winter.

The Chilkoot Pass, above Dyea, and the White Pass, above Skagway, have records which speak for themselves. Hundreds have lost their lives on them. An absolutely clear day on one of these passes in winter is a rare occasion. If it does not snow, the strong, icy-cold wind blows the plenty of snow that is already upon the ground about so much that it is with difficulty that one can see 25 yards in any direction.

These trails are traveled continuously by hundreds of people, dogs, and horses each day, yet it is hard to follow the trail if you are 50 yards behind even a dozen big teams of horses and sleighs. It would be impossible to follow the trails were it not for the fir trees planted in the snow about every 5 yards.

Storms have come up in five minutes on these passes out of a clear sky, compelling travelers to unhitch dogs or horses and seek safety in a rapid descent. Some storms have lasted three weeks. The sleighs and their contents abandoned in February perhaps would not be found until the next July. Such experiences are not uncommon. From them we may judge of the work necessary to keep any winter trail open which goes over a pass. I might add that every trail of any length will go over a pass.

The White Pass and Yukon Railroad, running at present from the summit of White Pass to Skagway, employs over a thousand men daily to shovel snow from its tracks in winter. The higher the pass the worse the trail is. The White Pass is the lowest known, and is 2,880 feet above sea level.

All winter travel in Alaska is dangerous. On the frozen rivers one is constantly in danger of falling through thin ice which the snow conceals. If the feet get wet, a change of stockings and foot wear must be made at once, or frozen feet will be the result. On glaciers one can easily fall into a crevasse, as hundreds have done, and never be seen again. On all glaciers the possibility of getting lost in storms is very great. The bodies of many unfortunates that have perished on them will never be found. Wherever a winter trail is made it should be so well marked that one can not lose it. Log cabins, with stoves, bunks, and wood, should be built not more than 20 miles apart over the entire route.

The following is a list of houses, boats, and towns that existed along the Yukon last winter

from Circle City to Skagway, a distance of about 900 miles. By their aid we were able to leave our tent and stove at Circle City:

	Miles.
Twenty-Mile House	20
Webbers	22
Coal Creek	22
Jim the Indian	25
Ivy City	25
Nation City	28
Star (Seventy-Mile)	29
Eagle City, Alaska	21
Steamer Arnold, Yukon transfer	24
Forty-Mile	22
Station No. 2	18
Station No. 1	20
Dawson City	18
Ainsley	21
Indian River	11
Reindeer	9
Cabin	4
Sixty-Mile	9
Nine-Mile	9
Stewart City	16
Kerry Mill	9
White River	3
Thistle Creek	13
Steamboats	10
Tulare Creek	10
Arctic Express Co	7
Bertha Creek	7
Big Four	10
Northwest Express	8
Selwyne River	5
Holbrook	12
Halfway House	7
Fort Selkirk	18
Carsen's	17
Arctic Express	13
Big Horn	12
Goarnig's house	4
Five-Finger Rapids	17
Northwest Express	22
Arctic Express	5
Little Salmon	35
Bank House	16
Big Salmon	25
Cassiar River	3
Wood-chopper's	1
Hootalinqua	33
Cabin (Halfway House)	17
Northwest Express	17
Cabin	34
Miles Canyon	28
Marsh Lake	25
Tagish House	25
Caribou Crossing	22
Bennett City	34
Log cabin, B. C	12
Summit, Alaska	15
Skagway	20

MOUNTAINS.

Alaska has more than its share of mountains. Many distinct ranges and many more conglomerate heaps diversify and break its surface in all directions. Topographically considered, it is a freak. Between two large streams thousands of miles in extent, and draining hundreds of thousands of square miles, frequently no distinct divide is determinable. The tributaries of the Tanana and Yukon, have their sources in that great mountainous tract extending from their junction eastward to a line from the head of Copper River to the head of Forty Mile. The heads of the Chena, Salchucket, Volkmar, and Goodpaster dovetail into the heads of Birch Creek, Charlie River, Mission Creek, and Forty Mile River.

One of the few parties of white men who ever succeeded in getting across from the head of Birch Creek to the Tanana did so by mistake. They were short of rations, and being on the head waters of Birch Creek wished to cross to the head of Charlie River and go down it to the Yukon. They turned east over a divide to where the head waters of the Charlie River were supposed to be, and found a stream flowing northeast toward the Yukon, which they concluded was Charlie River. They followed it in this direction until it was large enough to float a raft, when they built one and continued on northeast. Soon the river turned east, then southeast, south, southwest, west, and then northwest. They were compelled to follow it, and it led them to the Tanana, and thence to Weare. It was the Salchucket which they had followed.

Last summer a party of miners floated down the Yukon from Dawson to the mouth of Ray River. It took them two and a half months to get their supplies up to the head waters of Ray River. They were bound north for the Koyukuk. Supplies for two years, canoes, etc., were dragged up by hand to the source of Ray River. Over a divide they found a stream going north, which they supposed would lead them to the Koyukuk. Rafts were built and loaded, canoes were loaded, and they started down the supposed tributary of the Koyukuk. Not paying much heed to direction, they followed this stream until it joined a mighty river. In a few hours

the captain of a passing steamboat told them they were on the Yukon River. They had gone up the Ray River and down the Dahl River, coming out on the Yukon about 10 miles above where they left it three months before. A summer's work for nothing. Such experiences prove the concentric formation of the mountain ridges in some parts of Alaska.

In other portions, as in the country between Prince William Sound on the south and the Matanuska on the north, we have a great conglomerate mass of glaciers and high mountains. Out of this immense tract small streams flow north, east, south, and west.

The coast of Alaska is fringed from the boundary between it and British Columbia northward to Cook Inlet by a mountain chain known as the Coast Range. It varies from 2,000 feet to 8,000 feet in height. From Port Valdez to the head of Portage Bay, in Prince William Sound, the sea washes the base of the mountains of this chain. The same is the case over the glacier and down both shores of Turnagain Arm. The tract of country north of the latter and Prince William Sound and south of the Matanuska is a mass of very high peaks and glaciers. Extending northward from an east and west line drawn from the mouth of the Matanuska to the Sushitna, and lying between these rivers, is a mountain chain of considerable height, from 3,000 feet to 7,000 feet in elevation. It has many high peaks and glaciers running to the north for about 200 miles and ending 60 miles south of the great Alaskan Range. The latter is full of glaciers and trends west from the head of Copper River to the head of the Sushitna, and then southwest. It has a width of from 40 to 70 miles, and is almost 20 miles south of the Tanana River at the mouth of the Volkmar, and 50 miles south of the Tanana at its mouth. Between the Tanana and Yukon a great mass of mountains and mountain ridges trend generally east and west, with an elevation of 2,000 to 5,000 feet. No glaciers exist in them. The Tanana flows at their base in many places. On the north side the Yukon flows northwest from Circle City and away from these mountains till it reaches Fort Yukon. It then turns southwest and cuts through them at the Ramparts. Between the Yukon and Tozikakat are ridges from 2,000 to 4,000 feet in elevation, with no glaciers. Paralleling the course of the Yukon from Fort Yukon to Dahl River, and north of it about 25 miles, are the Romanoff Mountains, without glaciers. North of the Yukon, from Circle City upstream to the Alaskan boundary, the river runs at the base of the mountains, from 1,000 to 3,000 feet in elevation.

TREES, SHRUBS, GRASSES, FLOWERS.

Contrary to general opinion, Alaska is not one field of perpetual snow and ice. While the almost constant rays of a summer sun attack in vain the snow peaks and glaciers of the higher mountain ranges, there are many stretches of swamp land, river bottom, wooded hillsides, and elevated, rolling mossy tracts, from which the snow and ice are entirely absent for from three to six months of every year. Here we frequently find abundance of timber and vegetation. Naturally the evergreen trees—spruce, fir, and pine timber—cover most of the wooded stretches of Alaska. Next to these the cottonwood and poplar are the most plentiful, near the Pacific Coast, in the valley of the Matanuska, and over the rolling ridges north of it to the base of the Alaskan Range. In the valleys of the Tanana and Yukon the birch tree is the most plentiful after the evergreen. It is used by the natives in constructing canoes, baskets, and shelter. In all the river bottoms small willows are found, the principal summer and winter food of the moose. In addition, there are dogwood, alder, juniper, and hemlock.

An elevation of 1,000 feet or more above sea level in Alaska means a scrubby growth of timber, or none at all. In addition to the scrubby timber, we have real shrubs in the currant, blueberry, cranberry, and grouseberry bushes. The small tag alder is the most difficult of all brush to get through. There is also a small black berry growing on what appears to be a miniature pine tree.

Many beautiful varieties of flowers are found in Alaska. River bottoms and hillsides have great patches of bright color all over them by the middle of June. Wild roses are very numerous. The seed which remains on the bush after the flowers have bloomed proved very good eating for us at one time. The waters of ponds are covered with white and yellow water lilies. Far up among the snow peaks and crags, just below the perpetual snow line, the most

delicate and beautiful flowers are found. Lack of means to carry and preserve them prevented me from getting a fair collection. A few accompany this report.

Grass is present almost everywhere. While most plentiful in river bottoms, marshes, and near lakes, it can be found in abundance over high, elevated ridges above timber line. There are many varieties, some as high as a man's head. This high grass is not nutritious, however, having such a rapid growth that it lacks substance. The short bunch grass was preferred by our animals. In the absence of grass, the animals took readily to the small willows.

INDIANS.

The real Indian, as our mind pictures him, is extinct in Alaska. Of the thousands of savages who formerly called these wastes home, clad in the skins of animals and armed with bow, arrow, and spear, and eating and cooking in vessels of stone and birch bark, none exist. In their places we have a few hundreds of widely scattered people, wearing white men's clothing, using his cooking utensils and household furniture, following his customs and habits, and ambitious to be "all same white man."

The last fifteen years have witnessed a great reduction in the number of Alaskan Indians, and a great change in those who survive. Of the hundreds Lieutenants Allen and Schwatka report along the Tanana and Yukon, I saw a few small families only. Certainly the presence of white men has had some effect on the physical welfare of the Alaskan Indian. There have been a great number of deaths within the last few years among the Yukon and Tanana Indians.

The Coast Indians of Prince William Sound and Cook Inlet are poor specimens of humanity at best. Their principal food is fish (salmon and halibut). So much have they associated and intermarried with the whites that it is difficult to determine what their original customs and habits were like. At present they occupy so many varied positions under different conditions that a great difference exists, even between members of the same family. Some of the men are pilots on coast vessels, intelligent and respectable. Some of the women are the wives of intelligent white men, and are elevated correspondingly.

At Haines Mission a young Indian girl, Miss Willard, has charge of the Indian school, having been educated in our Eastern States. From this, the highest grade of intelligence and respectability, we have all kinds down to the lowest form of Coast Indians. These poor creatures resemble the ravens and gulls about them, getting an existence out of what others throw away. There are few normal individuals among them; deformities are frequent. They obtain a livelihood by catching fish, which they eat or sell, by helping to load and unload vessels, and by odd jobs the whites can find no one else willing to do. The Tyoonoks of Cook Inlet earn a few dollars occasionally by gathering the coal which is washed up on the beach by each succeeding tide.

While they understand more of the white people and their ways, from association, than many of the interior Indians, they are not the equal of the latter in physical or mental power. Their chiefs, or tyones, exert small influence.

The affairs of each small hamlet are influenced greatly by the power of missionaries. The latter have brought about a change in customs and habits, an approximation to the white man's way of living. These Indians seem a lazy, spiritless lot in their lowest forms, which are nearest the original Indian, managing in some manner to get a miserable existence out of the conditions that at present surround them.

We saw no Indians after leaving the coast until we had reached the lake region, which is drained by the western tributaries of the Copper River. Here we met the Matanuskas, fishing for salmon in Upper Lake Plaveznie, whose outlet stream, the Tazlena, is a tributary of the Copper River. These Indians are perhaps the wildest, bravest, and least known of the Alaskan Indians. They are least influenced by the whites, doing most of their trading second-hand with the Tananas to the north or the Copper Rivers to the east. Occasionally they come out to Knik Station, at the head of Cook Inlet. They are very large physically. It is a mystery where they get their height, as all the tribes about them resemble the Japanese in stature. The chief of the Matanuskas, Andre, is 6 feet 2 inches, and weighs 220 pounds. I saw several men who must be 6 feet 4 inches in height.

There are about seventy people in the tribe—men, women, and children. I saw no deformities of any kind. Their principal food is moose, caribou, sheep, deer, beaver, lynx, rabbit, squirrel, porcupine, whistling jack, and the goat; also a few of the larger birds, like the grouse, duck, geese, and swan; and fish, mostly salmon, with some trout and grayling. In addition to this they get what they can afford from the trading stations. The country about them produces the berries known to Alaska as cranberries, blueberries, pineberries, grouseberries, and currants. They eat a species of wild celery and several roots, one called celere, white and resembling the carrot in shape and the turnip in taste. As in most Indian tribes, the men eat first, the women next, and the children get what is left.

When we met them, on August 5, they were engaged in catching humpbacked salmon in the outlet stream of Upper Lake Plaveznie. This they did by standing in the water with spear poised. The latter was of wood, with steel, iron, or bone point. It had a strong deer thong secured to the upper end of it, the thong tied to the spear about a foot from the end. When the barbed point was thrown into the fish it came off the spear, and the line attached to it and the spear gave considerable chance to play the fish and land him without breaking the spear. This was a novel, but very good improvement over all the fish spears I have seen.

They expected to go to the mountains after caribou and sheep in a few days, having caught and dried all the fish they desired. Like all Indians, their capacity for food seems unlimited. The eating of one variety requires a great quantity, as we afterwards learned.

These people roam in the country bounded on the west by the Sushitna Valley, on the north by the Tanana, on the east by the Copper River, and on the south by the mountains north of Prince William Sound. The Coast Indians, Kniks, and Tyoonoks fear them very much. The Copper River Indians also give them plenty of latitude. To the north the Tananas are not so much in dread of them, their intercourse being slight on account of distance and natural obstacles, such as the Alaskan Range.

In summer they live in small tents and shelters; in winter in log cabins. Stoves, tables, beds, chairs, cooking utensils, clocks, mirrors, prints from illustrated papers, furnish and decorate the interior of their winter homes. The summer shelters are made of bark, moose and caribou skins, and drilling. All have good rifles and generally plenty of ammunition. They eat the entrails of animals and birds, the latter without cleaning. They still use the sweat bath, getting into an inclosure of bark and brush, where vapor from heated stones causes an almost suffocating heat, out of which they dash nude into an ice-cold stream. They have little or no faith in their medicine man, and are ready to take anything a white man says is medicine.

The men and women still wear earnips, but nothing is worn in the nose. Both paint the face and body, and wear bracelets and finger rings. The hair of the women and medicine men is long; the others usually let it grow in winter and cut it in summer. Their features are uniformly good. Some of the women are as beautiful as any Indian women I ever saw.

The men have a proud, fierce look, and seem to realize that they are more powerful physically than most men they meet. White men they regard with suspicion, and are very jealous of their squaws. The latter court the attentions of the whites, as their lot is a hard one with their brown masters. All the drudgery of camp life and packing loads from place to place falls to them. These Indians resent the presence of white people in their country, and were sullen and inhospitable while I was with them. The chief, Andre, told my Knik interpreter to tell me that I had no right in his country, as it belonged to him. He was informed that I would go where I pleased, whether he liked it or not. Any sign of fear of them might lead to serious trouble.

They all have dogs which resemble the Malanute dog of the Lower Yukon, but they are much smaller. In summer they pack them with from 20 to 40 pounds; in winter use them with their sleds.

When feeling good after a hearty meal the young bucks sometimes engage in friendly wrestling bouts. These, with occasional attempts at singing, are the only forms of native amusement known to the Matanuskas.

The young are carried on the backs of their mothers, either in a birch-bark basket or by placing the arms about the mother's neck and legs about her body, being supported in this position by a shawl or blanket.

We found many of these Indians using netting to protect them from the mosquitoes. I noticed one old medicine man, without covering, catching the mosquitoes and eating them. This they all do with the vermin they catch on each other's heads and bodies.

The girls are made to live alone in darkness on little food at the first sign of maturity. At childbirth a mother must live three days without anything to eat and take care of her child at the same time. Such barbarous customs account for the very few women and children in this tribe in proportion to the men.

Although women are very scarce, polygamy is not unknown. The children are given a pack to bear as soon as they can walk. It is surprising, but pitiful, to see what packs are placed on their poor little shoulders. The men frequently indulge in orations, like the Tananas and Yukon Indians. But one of these Matanuskas could be induced to pack for me. He was a young buck about 20 years old, and agreed to pack five days for a bright-colored blanket. I was to give him tea and coffee while packing. He carried some dried fish as food. I let him eat what we did, however, as it was contrary to a white man's way to sit down and eat plenty while a fellow-being at his side went hungry. Later I punished him, with others, by not giving them anything, because they lied to me constantly.

The chief is known as the "tyone," and next in importance is his family. After them come the medicine men. The remainder of the tribe owe allegiance to the chief, but he does not seem to have much power. Marriages have to be made with his consent. He comes in for a share of the game and fish everybody catches.

A woman who outlives her husband is unfortunate, as his possessions are divided up among the whole tribe at what is called a "potlatch." She is poverty stricken, and if she does not marry becomes a slave of her relatives. The oldest boy becomes the head of the family. His brothers and sisters are his slaves until they are old enough to marry.

After leaving the Matanuskas, we went for 80 miles without seeing a human being. At the forks of the Gakona River, and entrance to the pass through the Alaskan Range, we met a Copper River Indian and his little boy. He had come up the Copper River, which, he said, was four sleeps away, and was on a journey to the Tanana slopes of the Alaskan Range to hunt caribou. I engaged him to pack for us. He knew the Matanuska and feared him, but looked with contempt on the Knik. The latter was also an object of supreme contempt to the Matanuska, and would have been compelled to be his slave were it not for our presence.

This Upper Copper River Indian made an addition to feed, so I decided not to give him any food save tea and coffee, as it was impossible for us to tell when we would ever secure a fresh supply. He and his boy ate the entrails of all ducks, whistling jacks, or anything else we threw away. He put as much of a load on his child as the little fellow could stand up under, which caused the latter to have great difficulty in catching up with us. On one occasion I happened to be present when the little fellow came stumbling up to us, panting and sobbing as if his heart would break. He was afraid he would get lost if he had to stay so far behind. I put his pack on one of the mules, although I wanted to save them as much as possible. What was my surprise and anger next morning to find that his father had lightened his own load by giving him a larger load than ever before to carry. Of course I made the father pack all his own load, and left the little boy free to run along without any. This gave him an opportunity to lead one of the mules and made him feel very large.

When almost through the pass of the Alaskan Range the Matanuska came running to me one morning during a heavy rain storm and pointed off to a mountain about 2 miles away calling out "caribou" excitedly. I could not see any caribou, but saw something which looked like a man. With my glasses I made out clearly an Indian who had seen us and was following parallel to our course, running from rock to rock along the side of the mountains. We halted, and in about half an hour he grew weary of peeking at us from behind a rock and came running toward us.

The nearer he got the more nervous the Knik and Upper Copper River Indian got. The Matanuska gazed carelessly at his approach. The first two feared he was a Tanana. Being on his hunting grounds, they feared he would kill them. He was received by the Indians as they always receive a new arrival. No one spoke. He stood leaning on his rifle gazing at our animals, the first he had ever seen. The Knik and Upper Copper River Indians feared to look him in the face; but the Matanuska stared him out of countenance, with a fierce, contemptuous glare in his coal-black eyes. After the usual looking had been finished, I told the Knik to ask him who he was, where he came from, etc. This he did, trembling all the time like a leaf. I saw that he was telling me whatever the Indian compelled him to, regardless of my questions or of the truth. This Indian was from the head of the Tanana, and was hunting caribou in the mountains. He had come many miles, living on dried fish alone.

We found small families of Indians on the Tanana, where Lieutenant Allen saw hundreds. They proved to be the most prosperous Indians we had met. Their life is similar to that of the Matanuska. They trade directly with the whites and get better things. They are not the equal of the Matanuskas physically, as there is a number of deformed people among them. On 750 miles of the Tanana proper and its tributaries I saw 7 small hamlets, and not to exceed 100 Indians—men, women, and children. Those at Volkmar and Salchucket rivers go to Circle City to trade, those on the Chena to Circle City or Rampart City, those at the mouth of the Tanana to Rampart City, and those below the mouth of the Tanana to Weare. They have dogs, sleds, and birch-bark canoes. Their friendship for white people is great, and we owe our lives to their kindness. They would take no money for all the meat, fish, and tea they gave us.

In passing, it is but justice to say a word for these friends of mine, who found us all but dead in the wilderness, with the Alaskan winter closing in around us. Entire strangers and of another race, they received us as no friend of mine, white or colored, ever did before or since. They asked no questions and required no credentials. They were men. It was enough that their fellow-beings were starving. Unknown to them were the wrongs our race have done theirs for centuries. We were the first whites to visit their home. Their hospitality was the greatest I ever saw. It was the same at the village at the mouth of the Salchucket and again at the mouth of the Chena. At each place we were royally entertained. From somewhere half a handful of rice would be brought out and cooked for us, giving each a mouthful. This had been kept stored up for months for some special occasion when someone was sick. It had been part of some stores they had traveled 300 miles to get, in the dead of winter, and carried on their backs to their simple homes. Gladly they gave it all to us and asked nothing in return. Beaver tail is a delicacy with them, but they cooked all there was for us at each camp.

For saving her from burning, her dress having caught fire, a squaw gave me a handsome pair of moose-skin mittens. To my men were given beaded knife scabbards, or some little trinket, which to them meant a great deal. Simple, honest, trusting, courageous, these Tanana Indians could have had anything that belonged to me. Unfortunately, I was destitute, and so were my men. When I did find white men, they would sell me little for the Indians, fearing they would run short themselves. Our poverty was a source of good-natured amusement to these Indians. All we had to eat with were three little spoons. I carried mine in my hip pocket. The Indians always helped us first at meals. For plates we had a piece of birch bark; they ate from tin ones. When the moose or caribou was fried, they would hand me the frying pan, and watch with laughing faces while I pulled my little spoon out of my hip pocket, my trousers in shreds, and take out my portion of the moose meat on my piece of birch bark. At each camp they indulged in orations, apparently getting very excited.

There were many sick people among them, principal disease being bronchial trouble. They had several medicine dances by the medicine men. At the mouth of the Chena the old chief was sick. All the Indians got in a circle around the fire, under the shelter of birch bark and drilling. The medicine man started slowly around the fire, humming some song, making motions at the fire as if to take up armfuls of it. Soon his voice rose and his movements became more rapid. The old chief squatted inside of the ring with his back to the fire. Gradually the medicine

man became more and more excited, the Indians in the circle now crooning in low tones. He finally worked himself into a frenzy, running his bare arms into the flames repeatedly, apparently inhaling fire, and rushing to the old chief and blowing the same down his back, lifting his shirt collar to do it. When he had worn himself out roaring, jumping, snorting, and blowing, the circus was over and the chief was supposed to be cured. They evidently have little faith in their medicines, for they were anxious for me to get "white man's medicine" from the doctor at the steamboat. I purchased some cough medicine for them from the white men when I returned down the Chena in the lifeboat. The Indians in their canoes were very angry with me because I had not secured flour, butter, and sugar for them. I camped alone, and went over to their camp in the evening and tried to explain how to take the cough medicine. Passing the bottle to one, he looked at it a moment, took a drink, passed it to the next, and so it went till it was empty. The doctor's directions were one teaspoonful after each meal.

When I got to the mouth of the Chena I found that Blitch and McGregor had been treated royally during my absence. McGregor had traded his watch with the chief for some beaver skins. They were all feeling sullen and resentful toward us, however, when we left on the morning of October 7.

The Lower Tanana Indians live on fish principally, it being a poor country for game. They are much poorer than the Upper Tanana River Indians, and seem less intelligent and active. From the mouth of the Tanana up the Yukon and its tributaries to Skagway we saw Indians at various places, no large number in any one place and no great number in the aggregate. The best looking and most intelligent I saw at Fort Yukon. In general the Yukon Indians resemble the Tananas in size, but their long association with white men has left them very unlike savages as we understand the term. Many are pilots on the river steamboats. All live in good houses and have many of the good things white people have. Their standards of morality are much lower than the Indians who have had less association with the whites. In violation of the laws of Alaska, whisky is sold to Indians, and has long been a demoralizing influence among them. I saw but one Indian in going from Dawson City to Skagway, a distance of 600 miles. He was employed by white people and his name was Schwatka. He had been a guide for Lieutenant Schwatka and was proud to take the latter's name.

CLIMATE.

We found the climate of Alaska a very healthy one. It is almost perfect in the interior. During April and early May on the coast we had a few rain and snow storms. The thermometer ranged from 10° below zero to 60° above.

In June we had very few rains, with the thermometer ranging from 40° to 80° above zero. In July we had several protracted rain storms. From the 15th to the 25th it rained every day. The thermometer had about the same range as in June. During August we had clear weather until we entered the pass of the Alaskan Range; then we had rain, snow, and hail from August 13 to 23. The thermometer ranged from 20° to 60° above zero.

In the first two weeks of September we had about as many rainy as clear days. From the 15th to the 25th we had several severe snowstorms. The rest of the month was clear and cool, the theremometer ranging from about 10° below to 50° above zero. October was very clear, but each day it was getting colder, the thermometer ranging from 15° below to 35° above zero. The first six days of November were cold, and the mercury ranged from 25° to 35° below zero. From the 20th to the 27th of November it was very cold, and the mercury ranged from 30° to 45° below zero. The month was generally clear, not much snow falling.

Early in December the snow began to fall more steadily. All that fell remained; it was never warm enough to melt it. From December 18 to 23 the mercury ranged from 50° to 70° below zero. This was the coldest weather experienced. We traveled all this time and slept in a tent, not experiencing any great trouble. We had continuous cold weather until we reached the seacoast, on February 24. It did not snow a great deal. I never saw it warmer than 5° below zero from December 9 to February 24. On Lake Bennett it was 49° below zero on February 13.

On February 25 it was 23° above zero at Skagway, just over the Coast Range on the seaboard. The latter seemed worse to me than the former, as it was a damp, penetrating cold.

In the interior from 18 inches to 3 feet of fine, powdery snow fell during the winter. On the coast the snow was from 5 to 10 feet deep. I saw very few sick people, save from frostbite, in my journeys. The Indians seem afflicted with bronchial trouble. They believe that by removing their shirts at night around a camp fire and exposing their nude bodies to the flames they can cure themselves. Of course this only increases their sickness.

INSECTS.

Many varieties of butterflies and house flies are found in Alaska. Spiders are plentiful. Mosquitoes and white-legged flies are too numerous, and from June 8 till August 20 we had faces and hands covered to escape the ravages of the latter. It would be idle to attempt a description of the nuisance mosquitoes are in this country. One can not understand where they come from, until you realize the many days that have over twenty hours of continuous sunshine, and that the country has marshes innumerable, full of heavy vegetation. Coverings of netting for the face and thick gloves should be used during June, July, and August.

CLOTHING.

A campaign hat, a piece of mosquito netting, a blue shirt, corduroy trousers, summer underwear, cotton socks, a good, strong pair of shoes, and a thick pair of gloves are all a man needs in Alaska from June until September. A double outfit like the above ought to last him all summer. From April till June, along the coast, a mackinaw suit, heavy underwear, sweater, woolen gloves, and gum boots should be added to the above. In the interior in winter one needs heavy underwear, sweater, woolen socks, German socks, moccasins (white man's), fur cap and gloves, a parkee of drilling and another of fur. The Indian moccasin is worthless, wearing out in a few days. I wore one pair of white man's moccasins from December 26 till March 1, walking over 1,000 miles in them.

A Kenwood sleeping bag will be useful from April till November. In the winter one needs robes under and above him.

LAKES.

Many lakes were seen in Alaska by white men's eyes for the first time last summer. The largest we passed is Lake Louise, about 35 miles long and from 1 to 3 miles wide. Lake Blanche, Lake Adah, and many more unnamed, were discovered and located by us. We found them generally shallow and fringed with heavy vegetation and timber; frequently their surfaces were covered by white and yellow pond lilies. The region between the base of the Alaskan Range and the head of the Matanuska contains thousands of lakes of all sizes.

RIVERS.

With the exception of the Tanana and Yukon, I found all the rivers of Alaska, crossed or followed, very erroneously mapped, both in length and direction. The Matanuska has heretofore been ignored or unknown by most Alaskan map makers. It comes with its tributaries for about 160 miles from north of east out of the country between the Sushitna and Copper rivers. It is a shallow, muddy, glacial, swiftly flowing stream with high banks, usually filled with sand bars. Most of its tributaries come from the region between it and the Sushitna. Bubb River and its tributaries find their sources in the mountains to the east of the Sushitna; it empties into Lake Plaveznie, whose outlet stream, the Tazlena, empties into the Copper. It is a clear, shallow, swiftly flowing stream, generally between rolling hills after leaving the mountains. The Gakona flows southeast from the Alaskan Range into Copper River. It is a sluggish stream, between low banks, with marsh-colored water. The Upper Delta is a series of lakes, with clear water. About 30 miles from its source it becomes a glacial torrent, muddy and deep. It is almost 100 miles in length, and enters the Tanana through six mouths. The Lower Volkmar flows through a swampy country, with sluggish current and discolored water. The upper stream is very swift,

with clear water, and full of rapids. It is about 100 miles long, and flows south of west out of the mountainous country between the Tanana and the Yukon. The same description fits the Chena. The Tanana and Yukon have already been described by others.

List of plants collected by Lieut. Joseph C. Castner on Matanuska River, Alaska, 1898.

Anemone narcissiflora L.
Anemone parviflora L.
Aconitum delphinifolium Reich
Arabis lyrata L.
Viola glabella Nutt.
Geranium erianthum DC.
Lupinus nootkatensis Don.
Astragalus alpinus L.
Oxytropis lamberti sericea Gray.
Hedysarum mackenzii Rich.
Potentilla nana Willd.
Poterium canadense B. & H.
Rosa nutkana Presl.
Epilobium angustifolium L.
Epilobium latifolium L.
Sedum roseum Scop.
Cornus succica L.
Viburnum pauciflorum Pyle.
Arnica latifolia Bong.
Vaccinium vitis-idæa L.
Ledum latifolium Ait.
Ledum palustre L.
Moneses uniflora Gray.
Pyrola rotundifolia L.
Trientalis europæa arctica Ledeb.
Polemonium sp.
Mertensia paniculata Don.
Myosotis sylvatica alpestris Koch.
Pedicularis sudetica Willd.
Boschniakia glabra C. A. Meyer.
Pinguicula villosa L.
Rumex occidentalis Wats.
Streptopus amplexicaulis DC.
Aspidium spinulosum Swartz.
Equisetum sp.
Cladonia rangiferina L.

ALASKA—1899.

COOKS INLET EXPLORING EXPEDITION.

BY

Capt. EDWARD F. GLENN, Twenty-fifth U. S. Infantry, Commanding.

EXPLORATIONS IN AND ABOUT COOKS INLET.

By Capt. EDWARD F. GLENN, Twenty-fifth Infantry.

The military expedition into Alaska which I had the honor to command was known as Cooks Inlet Exploring Expedition. The personnel of the expedition consisted of Capt. Edward F. Glenn, commanding; Capt. Charles P. Elliott, United States Army, retired; Second Lieut. Joseph S. Herron, First United States Cavalry; Dr. H. R. Carter, and 13 enlisted men. The expedition also had 41 pack horses. Our base of supplies was Tyoonok, Cooks Inlet, Alaska.

My instructions from the War Department were to disembark en route to Tyoonok a small detachment at Portage Bay, Prince William Sound, Alaska, and explore, survey, establish, and mark the trail from that point to the camp now located at the head of Knik Arm. From the permanent camp at Tyoonok detachments were to be sent to explore the country to the northward via the Matanuska, Sushitna, Yedno, and Kuskokwim rivers for the most direct and practicable route from tide water to the crossings of the Tanana River. From these crossings the expedition was expected to proceed northward to the military posts established on the Yukon River, at Rampart and Circle City. One detachment was to explore the west bank of Cooks Inlet from open tide water to the head of navigation of the Sushitna River for the most practicable overland trail.

The district of exploration for the expedition was to be via the routes indicated and bounded on the north and west by the Yukon and Koyukuk rivers, on the east of the Copper River. The expedition was expected to cover as much territory as possible, and collect and incorporate into their reports all information that might be deemed valuable to the development of the country explored regarding topographical features, available routes of travel, feasible routes for railroad construction, appropriate and available sites for military reservations; adaptability for agriculture and stock raising, mineral resources, timber, fuel, food products; the stock best suited for food and transportation purposes; the number and the location and condition of the natives of the territory explored. The routes traversed by this expedition were to be definitely located and properly marked, in order that they might be known and used as routes of travel by the public.

On the morning of May 14 the expedition landed at Tyoonok. At this point we transferred our stock to the steamer *Duxbury*. When this labor was completed we steamed up to the mouth of the Sushitna River, 6 miles above, where the stock was disembarked again. On June 8 Lieutenant Herron and the men comprising the expedition which was headed for Eagle City and the Matanuska and upper Sushitna rivers were placed on board a boat which steamed for Knik station, reaching that point the same afternoon.

On June 30 Lieutenant Herron and the members of his expedition were camped on the Keechatno. On that day I bade farewell and Godspeed to him and his men, and started downstream for the Sushitna station. They were bound for the mouth of the Tanana River, which we calculated they would easily reach in a comparatively short time.

The waters of the Yentno River do not differ materially from those of the Sushitna. The former, from all information obtainable and from the appearance of the country (we could

plainly trace its course for some distance beyond the point we navigated it), heads in or near Mount McKinley, but on the western side thereof. Between it and the Sushitna lie the Yenlo Mountains, which reach their highest point on the south, just north of the river, which, in running east, passes close up to this peak. From there these mountains become lower until not to exceed 800 to 1,000 feet high, when they again gradually become higher and lose identity as a portion of the foothills of Mount McKinley. (21.)

We were close up to these foothills, where it was evident that the river narrows very much, but from the mouth of the Keechatno to where we turned around the river possesses the same general characteristics as the Upper Sushitna, running through a lower country, splitting up into many channels, with quicksand bottoms and sand bars of the same. The current of the Yentno from the Keechatno to the Sushitna does not seem so rapid as that of the Sushitna and probably does not exceed 4 to 5 miles per hour. We calculated that we averaged nearly 6 miles per hour during all of our run against the current or upstream.

From the head of navigation of the Yentno we could plainly see a break or gap in the mountains which we were satisfied was the pass through which Lieutenant Herron's detachment would go to reach the Kuskokwim River. From all appearances the Keechatno River headed at or near it, and it was the only break in the mountain range that looked low enough for a pass. Its direction from us was east of north and toward which the Indian guides pointed to indicate the trail they would follow. (22.)

At the mouth of Sushitna station I found five prospectors, viz, Messrs Krotzer, Hansen, Senecal, Bellmore and Dr. See, who had just come down the river from Clear (Chunila) Creek, a tributary of the Talkeetno. These men had gone up there early in the season upon representations of certain parties, who wrote them stating that they had found large deposits of gold in placer.

Upon their arrival these gentlemen found that the entire creek had been staked out by their correspondents, and that they had made their long and tedious pull up the Sushitna River for nothing. They remained long enough on the creek to satisfy themselves that the statements made to them were for the purpose of creating a stampede to that section, so that the owners of the claims could sell out their holdings.

This course, reprehensible under all circumstances, is especially so in regard to the interior of Alaska, which can only be reached, under present conditions, by the expenditure of considerable money together with an unusual amount of hard work and subjection to serious risks. In this instance several of the men affected had given up fine positions at home, and were forced to go to work by the day in order to earn money enough to get back to the States. We took them down as far as the mouth of the river with their boats and goods.

With this party came down also a Mr. Webber and wife, who had spent the major portion of last winter at the station, from which point they sledded their goods up to this same creek on the ice. As they had but one small dog, they were forced to do the greater portion of the pulling themselves, and the result was they had to make three trips, or pass over the same ground five times, in order to carry all of their stuff. This gives some idea of the amount of labor necessary to carry a few months' supplies for even short distances. Mr. Webber had contracted the scurvy so that the work fell principally upon his wife, who not only pulled their sled but attended her sick husband, for whom she cooked while resting.

On July 5, which was uncomfortably warm, we camped at the mouth of the Talkeetno. On the afternoon of July 6, we steamed up to Evansville. Here we met four prospectors who had come down from the mouth of Indian Creek on a raft. On examining the raft I found that it was dangerous for navigation purposes. The men comprising the party named were, E. A. Haven, Charles E. Hovey, E. A. Ackerman, and Joseph Anderson, all of Massachusetts. They had spent the winter in prospecting the country beyond Indian Creek and were forced to come out because of the exhaustion of their supplies. Their clothing was about as ragged and unkempt as their hair and beards. Some idea of their condition may be obtained from the statement that one of the party, who had not looked into a mirror for more than a year, was shocked to find that he had become entirely bald during that time.

On the 18th of July we ran down to the mouth of the Sushitna River. Here there is an immense mud flat, caused in great part, no doubt, by the alluvial deposits in the inlet of sand and mud from the river. It extends for at least 8 or 10 miles into the inlet from the mainland and is bounded on the east by Fire Island and Point MacKenzie and on the west extends below the mouth of the Beluga River. Into and through this mud flat flows the Little Sushitna, Sushitna proper, and Beluga rivers, besides two or three smaller streams that empty into the inlet between the last two rivers. Nothing but vessels of very light draft will ever be able to enter any of these streams on account of the shallowness of the channel by which they must be reached. Besides, as previously pointed out, these river channels, as they pass through these immense deposits, are not only very crooked, but are subject to constant changes by the action of the salt water of the inlet during the frequent storms of summer.

The country included between the boundaries mentioned, for a distance of 20 or more miles inland, is very low and swampy, and therefore can not be traveled over during the winter season when the swamps are frozen up. There is, however, a range of foothills along the western side of the inlet which terminates in Mount Sushitna, along which it is possible to construct a trail to Sushitna station. I was reliably informed by Mr. Cleghorn, who had interviewed them on the subject, that two Indians from his station had traveled during the open season from the mouth of the Skwenta, a tributary of the Yentno, to Tyoonok without any trouble whatever and had found a high trail with firm footing. If such is the case, and there can not be any doubt of it, then there will be no trouble in going from Tyoonok to the pass in the mountains through which Lieutenant Herron's party is supposed to have passed. This trail will save considerable distance as it is not to exceed 60 miles from Tyoonok to the mouth of the Skwenta.

On August 2 we returned to Tyoonok, and on August 5 we reached Latouche Island, on which some copper claims had been staked that were supposed to contain valuable ores. On August 16 I received the information that the two Indians who had been employed by Lieutenant Herron had deserted him after remaining with his expedition about one month. At the time of the Indians' departure, Lieutenant Herron was on the summit between the Sushitna and Tanana rivers.

On September 3, while superintending some work, I suddenly felt as though I were about to fall. I at first attributed this to my physical condition, but soon discovered that we were having an earthquake of no mean proportions. On October 25 we reached Valdez, and reached Orca October 27, arriving at Seattle November 3, 1899.

TOPOGRAPHIC FEATURES.

The mountain ranges of Alaska consist of the coast range which we see from Vancouver Island up to and beyond Cook Inlet. The Alaskan range which lies just south of the Tanana River—called the coast range by Mr. W. C. Hayes, of the United States Geological Survey—extends from a point just north of the bend in the Copper River, in the general form of a crescent, to the north and west of Cook Inlet, and terminates in the Aleutian archipelago.

In this range is situated the Mount McKinley group. According to Mr. Hayes, the range of mountains, commencing with what is known as the St. Elias group on the east and south, and which extends along the coast around by Yakutat and Prince William Sound to the Kenai Peninsula, in which it terminates, is called the St. Elias range, but is generally spoken of as the coast range. It is beyond question the roughest range to cross of any in Alaska. It has an average width of about 50 miles and is filled with snow-capped peaks, with the inevitable glacier lying between each of them, and it practically possesses no passes except over these glaciers.

Another small range, to which the term "Foothills" is constantly applied, lies between the Matanuska and the Sushitna rivers. It terminates in low hills near the mouth of the Little Sushitna River and extends on the north and west to the Alaskan Range, but where the Sushitna River breaks through on the north we again find comparatively low hills. This range reaches its highest altitude about the heads of the Talkeetno River and Chicaloon Creek. The next range encountered is the Ketchumstock Hills, just north of the Tanana River. Generally speaking, these are low, but badly broken up and rough in certain places, especially along the Volkmar

Creek, up which Lieutenant Castner tried to pass in the fall of 1898. Beyond the Yukon lies the Rocky Mountain Range proper.

The principal rivers in the country tributary to Cook Inlet are the Matanuska and Sushitna. The former runs a little south of west through a valley about 30 miles in width, lying principally on the north and west side, and heads in two or three lakes which also furnish water to a tributary of the Tazlena and lie in a very low pass that separates the two water courses.

The Matanuska, which is not navigable, is about 100 miles long and empties into the Knik Arm at the head of Cook Inlet by three distinct mouths, one of which joins with the waters of the Knik River. The latter is about 30 miles long and flows into the same arm from the south.

The Sushitna River also empties into the main (Cook) inlet by three distinct mouths which form a delta that extends to the mouth of the Little Sushitna. The latter, lying between the main stream and the Matanuska, is about 30 to 40 miles long and is not navigable. The Sushitna runs almost due south for about 100 miles, or from what is generally known as "The Forks," formed by the junction of the Talkeetno, Middle, and West branches.

The first named heads in the Talkeetno Mountains on the east, and is about 60 or 70 miles long. The West Branch heads in the Mount McKinley Group, as far as we could ascertain, and its length is unknown, but it carries very nearly the same volume of water as the Middle Fork, which heads in the Alaskan Range, and is about 150 miles long and is navigable for about 40 to 50 miles from its mouth.

Another tributary of the Sushitna coming in from the west is called the Yentno, and also heads in the Mount McKinley Group on the west side. It empties into the Sushitna about 25 miles from the mouth and about 3 miles above the trading station. It carries about as much water as the main Sushitna, is about 150 miles long, and is navigable for about 80 to 100 miles from its mouth.

The valley of the Sushitna is very low and marshy for about 20 miles above the mouth. Its general width up to the forks is from 70 to 100 miles. From that point north via the Middle Fork this valley is very much contracted, the foothills coming quite down to the river. The valley of the main river below the forks, close to the river banks, is covered with a dense growth, principally moss, small brush, and cottonwood trees. It is very swampy and therefore difficult to travel over. Farther back toward the foothills, on either side, the country is more rolling and plenty of high ground with firm footing can be found.

The valley of the Yentno is not so wide and the high ground comes down closer to the river banks. After passing the mouth of the Skwenta, its principal tributary, it becomes somewhat more flat, and yet it presents no serious obstacles to travel, as far as could be ascertained. It terminates in the Alaskan Range of mountains, taking its source in the Mount McKinley Group on the west side.

The Beluga River flows in a general easterly direction and empties into the main inlet about midway between the mouth of the Sushitna and Ladds Station. It heads in the mountains back of Tyoonok, is of glacial origin, and is navigable at high tide for 8 to 10 miles from its mouth for a light-draft river boat. This feature will be of value should the coal seam, found a few miles farther up this stream, be opened up, as it probably will be, owing to its superior qualities as compared with other seams found in the main inlet. The Sushitna River, which empties into the main inlet from the west at Ladds Station, is not navigable and is about 30 miles long. Its principal value consists in the fact that it renders Ladds Station a more desirable cannery site than if it were not there.

AVAILABLE ROUTES OF TRAVEL.

The first route investigated was from Portage Bay to Knik Arm, where it was to connect with the overland trail investigated last season. The object of this was to get a port of entry that has unfrozen tide water throughout the year. A trail having been followed by Captain Kelly of my command, last season, further investigation was deemed inadvisable. This work was placed in charge of Lieut. J. S. Herron, U. S. A.

The investigations of the past season covered three distinct and separate routes to the Yukon from the head of Cook Inlet. The first was under the charge of Lieutenant Herron, whose objective was the mouth of the Tanana River and Rampart City, about 80 miles above. His route was via the Sushitna and Yentno rivers to the head of navigation by boat, and thence overland to the East Fork of the Kuskokwim River, which he was to cross, and thence proceed by the best available route to his destination.

This party was landed some distance above the mouth of the Skwenta, as already narrated, and from which we could distintly see a break or pass in the mountains. Our information of the country to the north and west of this range of mountains consisted of observations made by parties traveling on the Yukon and Tanana rivers. According to this information, the country between the mountain range and the mouth of the Tanana River, is low and rolling for a distance of about 100 miles, so that we had but little doubt that Herron's party would reach its destination within a comparatively short time after starting from the head of navigation on the Yentno.

I still think that there is a practicable route to be found, as above outlined, and shall continue in this belief until the contrary is positively ascertained. It is without doubt the shortest route from tide water to the mouth of the Tanana, which is the center of the military district of Alaska. It can be traveled overland directly from Tyoonok, but this is unnecessary during the open season, as much time can be saved by steaming up the Yentno River, as was done the past season.

The country on the south and east of the Alaskan Range is a good one, because the soil is excellent. There is plenty of wood and coal for fuel, as well as lumber for constructing any kind of trail or shelter; also grass in abundance for stock. Then, too, the climate, as will be noted in discussion of the weather, is as satisfactory as could be expected in an Arctic province, and without a doubt as healthful as any other part of Alaska.

The second expedition was to have been personally conducted by me, but was of necessity turned over to another. Its objective was Circle City, Alaska, to be reached via the Sushitna River to the head of navigation, thence across the country between the Middle and West forks to the head waters of the Cantwell River, from which it was to continue in a northeasterly direction to the Tanana River. After crossing this it was to strike the Indian trail that runs up the Saljacket Creek to the Chena River, and thence over the divide to Birch Creek and down it to its destination.

I have already narrated how this expedition, after reaching the valley of the Tanana River with every member of the command and every head of stock in good condition, and with plenty of stores to carry it to and even beyond its destination, lost heart because its members saw a comparatively insignificant swamp in front of them. The sight of this unexplored swamp, like the cry of "mouse" to the average female, caused an ignominious and inexplicable flight.

A glance at the position of the expedition on the map will show that it was nearer to Circle City—its destination—than to Tyoonok. From a careful inquiry I am satisfied that this swamp could have been avoided by proper exploration of the high ground surrounding it, but even if this were not the case there is is no sort of doubt that the swamp itself could have been crossed by corduroying. This class of work was contemplated when the detachments were sent out. It was not considered necessary to specifically mention it, because the necessary tools for the work were sent along, and it was known that macadamized roads, paved streets, and railroad grades are not usually found in an unexplored country.

It is true that the responsibility for failure must rest with the person in command; but it should not be forgotten that the members of a command share in the success and should also carry some of the blame in case of failure, and there is but little doubt that, had the majority of this detachment insisted upon pushing through to Circle City, the minority would have accompanied them. From their own statements, no obstacles worth mentioning had been met with, and, from the best information obtainable, they had already passed over worse territory than was to be anticipated beyond the Tanana. The only serious obstacle in their front was the crossing of that river, which could have been easily accomplished with the appliances carried with them.

I have always thought, and still think, that this is the best trail, considered from every standpoint, between tide water and Circle City. The navigation of the Sushitna River carries one over 100 miles due north. From that point it can not be to exceed 150 miles by trail to the Tanana, and but little more than that distance from that point to Circle City.

The trail to be followed by them, in so far as we knew, had never been traveled by white men, although a portion of it, viz, from Circle City to the Tanana River via the Chena River has been traveled over repeatedly. This latter is evidently the route followed by Lieutenant McManus while stationed at Circle City. This detachment did determine that a good trail has been found to the Tanana from the head waters of the Sushitna. Not only the reports concerning it, but everything else confirms the fact. The country passed over was not rough enough to cause trouble with their shoes, and their clothing was absolutely intact when they returned.

Over this trail communication can be established with the mouth of the Tanana River, which would necessitate boating up that river to the point where the trail strikes it. This would be below Bates Rapids, from which point to its mouth the Tanana is easily navigated. By this route mail could easily be gotten from Cook Inlet to Fort Gibbon in from eight to ten days, and probably in less time, if relay stations were established from the mouth of Indian Creek to the Tanana.

The objective of the third party was Eagle City, which they were to reach via Matanuska River to Chicaloon Creek, thence to the Talkeetno, thence across to and up the middle fork of the Sushitna to the trails of Lieutenant Castner and myself last season. From this point they were to examine the Alaskan range of mountains for passes, and from thence they were to pass the range and go across the Tanana to Eagle City by the most feasible route.

This detachment was purposely sent out of its proper course, commencing at Chicaloon Creek and ending at the point where my trail of last year was struck, for the purpose of exploring the country in the section designated. It was useless to explore the valley of the Matanuska farther, as we had been over it several times the year before. It spent considerable time also in exploring for passes through the Alaskan range, as set forth in the report of Mr. C. E. Griffith, who was in charge, so that a very much greater time was consumed in getting from Knik Inlet to their destination than necessary.

From personal examination I know that a practicable trail, available for both summer and winter use, is to be found up the Matanuska River to its head, and from there to the Slahna River or Mentasta Pass. At this point it strikes the trail from Copper Center and Valdez and coincides with it to Eagle City. From that point (Mentasta Pass) to Knik, a railroad could readily be constructed which would be free from all dangers as to snow slides, and have a good grade. From the report of Mr. Griffith, taken in connection with my own investigations of last year, the distance between Knik Arm and Eagle City can be readily traversed in twenty-five days' travel. It is especially valuable for summer use in carrying cattle across to the Tanana and from there to points on the Yukon, since the season opens and the grass grows earlier at Knik than at any other point of Cook Inlet, which, in turn, is more advanced than any part of Prince William Sound and, it is believed, is more advanced than the Lynn Canal, which is somewhat to the southward.

The destination of the fourth party, under Sergt. Frederick Mathys, was Tyoonok, which he was to reach from the head of navigation of the Sushitna River via the valley of that stream on the east side. This he failed to accomplish, but came down to the Knik via the trail of Mr. Griffith. This work, however, was subsequently performed by Private Van Schoonhoven's detachment. It was found impracticable to send a detachment to explore the country along the western and northern coast of Cook Inlet, since, after making up the other detachments, there was no one to undertake the work.

In regard to all of the trails starting from the head of Cook Inlet, it must be remembered that this inlet is not navigable from the latter part of November to the latter part of March, on account of floating ice. During the other eight months of the year, this inlet is subject to very high tides, with very strong and swift currents. This is especially true as to the upper portion of the inlet, the navigation of which is always attended with more or less danger, though vessels

constantly navigate it without very much trouble. If wharves were constructed, so as to facilitate the handling of freight, practically all of the inconveniences would be removed, since vessels could readily lie with safety, either at these wharves or at anchor.

FEASIBLE ROUTES FOR RAILROAD CONSTRUCTION.

There is no doubt that a railroad could be readily constructed from Tyoonok up the Sushitna River Valley and thence via the trail followed by the Van Schoonhoven party to the Tanana. If the road would traverse the east bank of the river, it would be necessary to bridge the Sushitna, Talkeetno, and Middle Fork, and if it should go up the west bank of the Yentno and West Fork, in addition, in each case, the Beluga would have to be bridged. Material for such construction can be found on or near the route followed and good grades are obtainable in either case.

There is as yet practically no development either of the agricultural or mineral resources of the Cook Inlet or country tributary to it that warrants even the contemplation of a railroad therein.

APPROPRIATE AND AVAILABLE SITES FOR MILITARY RESERVATIONS.

In addition to the establishment of a garrison on Kadiak Island, or at Unalaska, both of which, on account of geographical position, might be advantageous, a reservation should be maintained at the head of Cook Inlet. The best place for it unquestionably is in Knik Arm, at or near Palmer's cache, which is the head of navigation, and where good anchorage can be obtained for seagoing vessels. The most desirable site on the Sushitna River is that surveyed by a detachment of the command during the past season. Of course, there is no necessity for a reservation here at present.

At least one military reservation should be declared on the Tanana, and it is probable that it would be wise to declare more than one. This river is navigable to Bates Rapids, from its mouth, and it is probably navigable for a very much greater distance for light-draft vessels, since there is a slough that passes entirely around these rapids. It is too early as yet to determine the exact localities best suited for military purposes, because of the scattered nature of the population of the territory. That valuable deposits of mineral will be found in the section of country tributary to the Tanana there is little doubt. Until that time it will be unnecessary to establish military reserves, except as may be necessary to establish relay stations for the protection of persons traveling along the "All American" trail when the same is definitely established.

MINERAL RESOURCES.

Very few, if any, new discoveries of placer or lode claims were made in the Cook Inlet and tributary country during the past season. The Sunrise mining district is the most important in the Cook Inlet country thus far operated. As previously stated, the work performed in the foothills along the Sushitna, although comparatively insignificant in amount, has not been of such a nature as to warrant very great expectations as to that section. Some gold was taken out of the country at the head of the Andrews River, which is a tributary of the Sushitna from the east, just above Cook Inlet, but no very great amount, and the work in that section practically ceased this year.

TIMBER.

The best timber grown there is the fir and spruce, which was seen by me in Portage Bay and in one of the tributaries of the Chestochena River, in the Alaskan Range of mountains. Along many of the rivers, especially toward the foothills, quite an amount of lumber may be obtained. The trees that most abound are the several varieties of cottonwood, which are not very valuable whatever the size. The tendency of the climate of Alaska is to stunt the growth of the timber, and in the open places it is found to be very much twisted and shaken by the winds that prevail in winter.

There is plenty of excellent spruce and fir logs obtainable for the construction of the log cabins that are used for dwellings by the inhabitants. These are covered with shakes. Shingles

are not very expensive, however, when the item of transportation is considered, and many houses are covered with them. Lumber for use in the Inlet at the present time is transported from Juneau, and similar ports, and is worth from $30 to $40 and $50 per thousand.

FUEL.

There is an abundance of fuel throughout all Alaska. The only exception to this is, when one travels above the timber line on the mountains and over divides, but even then the distance to fuel is usually very short.

The most accessible fuel after leaving the coast is wood, of which the principal varieties are the several cottonwoods, which are not very valuable, since they are hard to burn even when dry. The birch is valuable, both green and dry. The spruce and fir will burn green. Of the brush, I find that the tag alder and willow predominate. The last two are valuable because they are found highest up on the hills and mountain slopes.

In Cook Inlet there is an abundance of very satisfactory coal, when the price is considered. That used by us was mined by the Indians just below Tyoonok from a vein that crops out from above the high-water mark. The vein reaches as far down as low-water mark, and probably farther. The seam above high water is fully 6 feet thick. There is another outcropping of coal near Homer that is of better grade, but more expensive than that obtained at Tyoonok. A short distance up the Beluga River some specimens of very good coal have been found, said to be about 6 or more feet in thickness and readily accessible.

In a great many places along both the Sushitna and Yentno rivers, outcroppings of coal of about the same grade as that found just below Tyoonok were observed. It is not believed that any of this is coking coal, so not valuable for use in mining further than to generate steam. Good coal was found by us near the head of the Tazlena last year, and from the report of Mr. Griffith it will be observed that deposits have been located in or near the Alaskan Range of mountains.

ADAPTABILITY OF COUNTRY FOR STOCK RAISING.

There is no portion of Cook Inlet in which stock can not be wintered if food is provided during the previous summer. Whether cattle, horses, mules, and sheep will live entirely upon the country, if turned loose during the winter, is very doubtful. They will live on Kadiak Island, and it may be that they will do so at and around Anchor Point on the Kenai Peninsula, but not in the upper inlet nor in any of the valleys of the streams emptying into it.

There is an abundance of good, nutritious grass growing in all of this country that will make good hay, and which will sustain life without any grain, if necessary. Hay can be put up in abundance, and with proper shelter cattle can, or should be, raised with profit in a great many sections of the Cook Inlet country. I see no reason why the caribou or reindeer can not be domesticated and raised in that section of the country with great profit. It is believed that the domestic sheep and goat will live in the same country as the wild sheep and goat. The former are found in great numbers in all of the mountainous portions of Alaska, including the Alaskan Range. If stock is raised, except perhaps the reindeer, it will be advisable, and probably necessary, to protect it from the weather during the fall and spring months, especially when the cold rains prevail.

The climate of the Cook Inlet country throughout the year is to all intents and purposes the same as that of the middle northwest, except that during the winter there is a greater snow fall. The lowest recorded temperature, both at Knik station and Tyoonok, was higher than the minimum in any of the middle northwest States, and the average for Cook Inlet was probably much higher than in any of those States.

STOCK BEST SUITED FOR TRANSPORTATION PURPOSES.

As just stated, the raising of reindeer and the domestication of the caribou should be encouraged as much as practicable, not only because the game of Alaska will certainly disappear as the country gets settled, but the fish, the next great source of food supply, will share the same fate.

Something must be raised there for the natives to subsist upon. These animals must necessarily be valuable for transportation purposes during the winter season, when it is out of the question to make use of horses, mules, or cattle. The dog, although very extensively used at the present time, can not be so valuable as the reindeer, since he can not draw as much load and is entirely unsuited for food. In addition, food for the reindeer—moss—will always be available, and will not have to be transported for long distances, as in case of food for dogs.

For transportation purposes during the summer season, the only animal that is suitable is the horse—including in this term both the mule and burro—especially the latter, as he can, like the goat, live where either of the others will starve. He will eat grass, leaves, sticks, and brush, and is not averse to looking for sustenance in rejected tin cans. As between the mule and horse, the latter is preferable for many reasons. He is a much better rustler, and when limited to grazing, will carry as much or more than the mule. He is far more tractable in rough ground, and while not quite so sure footed in a mountainous country, will cross the swamps with much greater ease and safety, which far more than compensates for the difference in respect to sure footedness.

For a small party of prospectors who wish to prospect, and are not in any great hurry to reach a particular place, the burro is certainly the best pack animal, since he will carry much greater loads, in proportion to his weight, than either the horse or mule. He is much more easy to handle, is not so apt to stray away from his owner, and will live on much less and, generally speaking, is much better adapted to work in the mountains of Alaska, as he is in the mountains of this country. For exploring purposes, or carrying the mails, or any work that requires constant travel, the horse or the mule, preferably the former, will give the greatest satisfaction.

ADAPTABILITY TO AGRICULTURE.

From an agricultural standpoint, Cook Inlet and the country tributary thereto may be safely regarded as the garden spot of Alaska. I saw at that place the gardens of the Russian priests, which furnish the employees of the canneries and some others with all the vegetables they consume. Without going into details it is sufficient to state that here practically everything one procures in the markets of Oregon and Washington is obtainable from these gardens. At Tyoonok, Knik station, Hope City, Sunrise City, and Sushitna station a large variety of vegetables was raised during the past summer. At Tyoonok a large amount of potatoes, turnips, and other vegetables was raised. The potatoes were planted on the side of the very steep hill that lies just back of that place, principally because it is exposed to the southern sun through the summer months. On the top of this hill is a stretch of level ground, of which several acres have been cleared and put under cultivation. Here the majority of the vegetables was raised, and here experiments were made with cereals. The plate is from a photograph taken by myself, and shows, rather imperfectly, the grain and a partial list of the vegetables, but does not include everything cultivated during the past season. Those shown in the picture are wheat, rye, oats, barley, buckwheat; of vegetables, there are the turnip (ruta-bagas), radishes, potatoes, celery, peas, beans, snap beans, beets, onions, lettuce, kohlrabi, carrots, parsnips, cauliflower, and cabbage. (35.)

I noticed in one garden some turnips that had been sown very thick and in which every seed had apparently germinated. The stand of turnip was so thick that it was impossible to thin it out rapidly enough for table use. So thick were the turnips that one could see nothing but their green tops and the exposed turnip. Yet they attained a very good size, in many cases when only a portion of the root was covered with earth; in fact, with the entire bulb exposed above ground. (46.)

I consider that gardening in this section of Alaska has passed beyond the experimental stage. It was frequently stated that potatoes, turnips, cabbage, beets, etc., grown in Alaska, would not keep during the winter, but thorough investigation showed that this was not true. In properly prepared root cellars all such vegetables will keep as perfectly as in any other section of the United States.

As to cereals, there is no doubt that rye, oats, barley, and buckwheat can be profitably raised. Wheat will grow and head out well, but it is not at all certain that it will mature; the

chances are that it will not do so, as a rule. Indian corn can not be raised with profit, although it is believed that for table use some varieties of "six-weeks corn" can be grown to advantage.

The only drawback to successful gardening or farming in this section of Alaska is the first expense of preparing the soil for planting. The entire country is covered with a dense growth of trees, underbrush, grass, and moss, which it is difficult to remove. One can scarcely expect to obtain much of a crop for the first season, as the ground can not be gotten into condition. After that, not only can good crops be raised quickly, but a ready market can be obtained for them. In addition to the valley of the Matanuska River, I can include those of the Sushitna and Yentno rivers, the dimensions of which are much greater and in which the soil is quite as fertile.

In addition to the cereals and vegetables mentioned above, it is believed that certain fruits can be grown in Alaska. Experiments should be made with some of the hardier varieties of apples, which there is but little doubt will thrive. Berries will grow well, of course, as all of them grow wild in every section of Alaska. The list includes strawberries, raspberries, blackberries, whortleberries, huckleberries, currants, cranberries, both high and low bush, and several varieties of moss berries, besides some others unknown to me. People in Alaska eat every berry that grows there, believing that they are not only harmless, but healthful and of good flavor.

The lowest recorded temperature at Tyoonok during the winter of 1898 and 1899 was 33° below zero. The temperature during the summer months is very much more mild than it would be were it not for the Japan current, which extends along the entire Pacific coast from the Aleutian Archipelago to below the State of California. This current also causes a large amount of rainfall along the coast region. This not only seriously interferes with the maturing of the crops at times, but causes a very rank growth of vegetation during the open season. The rainfall in the valleys of the rivers of this section is almost, if not quite, as great as that on the coast. Even inside of the coast range of mountains there is an ample rainfall for all purposes. There was much more during the year 1898 than during the past season in the interior.

GAME AND FISH.

The principal game and fur-bearing animals of the country made use of by the natives—and by others—for food are the moose, caribou, mountain sheep, wild goat, bear, wolf, wolverine, lynx, fox, marten, rabbit, parkee, whistling marmot, beaver, sable, duck, goose, swan, crane, snipe, grouse, ptarmigan, and some smaller birds. The moose is the largest animal and is found during the summer months in the brush on high ground, where they go to avoid the pests, such as moose flies, mosquitoes, gnats, whitestocking flies, etc. They are very wary and hard to find on account of their keen scent, except during the rutting season, when the bull moose roams very much more in the open and is not so careful to conceal himself. The moose are found in and along the valleys of the streams traversed by us and are, apparently, in much greater numbers on the Kenai Peninsula. The favorite time for hunting them is during the winter season when the snow is rather deep and covered with a slight crust.

The caribou is a much smaller animal, and ranges more in the open country of the foothills during the summer season, and runs in herds of from 2 or 3 up to 40 and 50. They are found in the foothills of the Matanuska and Sushitna rivers, also in the Alaskan range, but seem to be very abundant in the section of country between the headwaters of Indian Creek and the Tanana River. They are quite as curious as the antelope and not quite so wary, being very readily killed when seen.

The mountain sheep can be seen in all of the mountains of Alaska visited by us. Although keen of scent, it is not a difficult task to kill all that is needed for fresh meat when in or near the country in which they graze. The only hard work in connection with hunting them consists in climbing the hills upon which they feed.

The wild goat is much more scarce; the only place I have known them to be found was in the valley of the Matanuska River, where the Indians kill a few each season. Wild goat meat is not as good as that of the wild sheep. Like the latter, the yearling goat is the more toothsome, but

after a continuous salt-meat diet of a few weeks the oldest and toughest of either variety is eaten with a relish.

The varieties of the bear are the black, brown, and glacier. The black is the smallest, furnishes the best fur, and is the easiest killed. The brown bear grows to a much larger size and is very much more ferocious, but is not disposed to attack man unless wounded. It is not unusual to find a black or brown female followed by cubs that are both black and brown, showing that these two varieties run together. The glacier bear is found only on or near glaciers, from which fact they doubtless receive their name. They resemble the brown bear very much in everything except color, so that it is not at all improbable that they are a species of brown bear that by constant living on glaciers acquire their peculiar grayish color, as does the rabbit, who becomes white during the winter season. His isolation seems to render him very much more ferocious than either of the other varieties. The food of all varieties consist of fish and berries.

The wolf is not so plentiful as in the past, and very few of them were seen by detachments traveling through the country. Of these there are two varieties, the gray and the black. Some wolverines and lynx are also killed by the natives each season.

The varieties of the fox are the silver gray, the black, blue, and red. The fur of these is of considerable value and is rated in the order named, the silver gray being by far the most valuable. They are also very scarce and can not be propagated like some of the other varieties. The propagation of the blue variety is being experimented with in some of the islands of Prince William Sound and near Kadiak.

The rabbit appears in great numbers periodically, when they suddenly disappear for another period. We saw none last year, although there was an abundance of signs everywhere. This year a few were caught at Knik Arm, indicating that they have commenced to multiply again.

The parkee is a small squirrel with the habits of the prairie dog, and is caught in great numbers by native women. The hides of the animals are made into parkees—a kind of coat—and parkee blankets, which are very light, durable, and warm. The parkee is easily tamed, and his hide is very tough. When a parkee is made, the hides are sewed together with sinew, without cutting in any way. The backs, with the tails still clinging to them, form the outside of the robe, the bellies the inside of the robe.

The whistling marmot is found in the interior, usually on high ground, and upon hillsides, and receives its name from the peculiar whistling sound made when seeking cover. They live, as do the parkees, in holes in the ground. Their meat is very palatable and is much relished by the Indians, largely because it is fat.

Very few beaver or marten are left in the portions of Alaska visited by us, and this is true of fur bearing animals generally.

In the fall of the year the tide flats at the mouths of all the rivers are filled with geese, duck, swan, crane, snipe, etc. There is little trouble in securing them in great numbers. The best shooting season is just before they commence their southern flight. The majority of these breed in the localities mentioned, but the spring flight came before we arrived in the inlet.

The grouse is usually found in the low lands, while the ptarmigan, which is also a species of pheasant, prefers to remain near the snow line. They are both found in great numbers in certain locations and are very toothsome.

In regard to the fish of Alaska, special attention is called to the report of Capt. Charles P. Elliott, who was charged with obtaining information as to that industry, as carried on by the canneries located in Alaska.

NUMBER, LOCATION, AND CONDITION OF NATIVES.

This subject, particularly as to the natives of the coast, was also intrusted to Captain Elliott. The condition of these people is such that relief should be afforded them as soon as practicable. There is not much doubt that the Alaskan Indian, like his brother in North America, must give way before the white man who strips him of his fish and game, upon which he has been taught to subsist from childhood. To obtain a livelihood in any other way is entirely foreign to his

nature and education, and yet he must learn to do this, if he expects to survive under the new conditions. His condition may be very much ameliorated by lending a helping hand in the shape of proper instruction for the battle of existence. This can not be accomplished, in my judgment, by supporting him in idleness, but can be accomplished by teaching him, when young, some useful trade, and with it the necessary knowledge of the English language so that he can hope to compete for the necessaries of life.

The number of Indians at Sushitna is placed at 183 souls, including men, women, and children. Of those located at Knik Station, there are 149. This completes the statistics of those living in sections traversed by detachments of the command, except in the Kuskokwim country. Schools should be established in the Cook Inlet country, where the English language should be taught.

RECOMMENDATIONS.

I recommend that the country from Circle City to the Tanana River, at the mouth of the Saljacket Creek, be explored for a trail that will be available for both winter and summer use. This will connect with that followed by the detachment starting from the mouth of Indian Creek on the Sushitna River and can be conducted from Circle City.

I also recommend that suitable provision be made for the enforcement of the fish laws now in force in Alaska, and, if these are not sufficient, that more stringent rules be adopted to preserve the salmon from complete annihilation. I indorse the recommendations of Captain Elliott in this regard, and agree with him, that unless very thorough supervision of these canneries is maintained, it will not be long before the salmon industry will be a thing of the past in Alaska.

To any one who has spent any time in Alaska it is apparent that the Territory stands in greater need of a competent civil government than anything else, but, since this is foreign to the scope of this report, will not be entered into.

FROM KNIK STATION TO EAGLE CITY.

By Topographer C. E. GRIFFITHS.

On June 9, 1899, I left Knik Station, Alaska, accompanied by 1 hospital steward, 1 private soldier, 3 packers, and 1 Indian guide and 17 pack animals for Eagle City. On June 11 we crossed and camped on Moose Creek. On June 12 we crossed Granite Creek, near its mouth, and camped on the Matanuska River. We passed successively on the same day King and Marshall creeks, and in due course of time reached Chicaloon Creek, camping near its mouth. After passing up Chicaloon Creek for quite a distance we got well up into the mountains, which were quite high and which still had some snow on them. On June 17 we reached the head of the Chicaloon without mishap. On reaching Chicaloon Pass we found considerable snow in spots, and we were compelled to go through several snowdrifts from 1 to 4 feet in depth. The summit of the pass is quite flat and is cut by several short, deep canyons.

Reaching the Talkeetno we proceeded down the stream. En route we saw many signs of caribou and bear. In order to get out of the Talkeetno Valley, I determined to follow up the North Fork of the Talkeetno River. The North Fork comes through a box canyon 300 feet wide and 300 feet high. On June 24 we crossed the North Fork at the foot of the canyon, and after a steep climb of 300 feet reached a bench that extended between the high mountains on the left and the canyon on the right. At a distance of 5 miles farther down we crossed the south bank of North Fork and continued our course to the summit.

The country traversed up the Talkeetno Valley to the North Fork is a sloping bench covered with vegetation, which affords good feeding for game, and later in the season good grass for stock. The Fork heads near the summit in a series of small glaciers lying in a large circular basin, and which are surrounded by very high mountain peaks, which present a grand view of

picturesque beauty in their snowy whiteness. The peaks are completely covered with snow on their northern slopes. We reached the summit on June 25. The latter is 10 miles from the Talkeetno River, and has an altitude of 5,825 feet. The north slope of the pass was very steep for half a mile and was covered by very deep snow, which began at the very summit and extended for over a quarter of a mile down the side. We had to break trail through this snow for our animals by tramping and packing it down until it would sustain the weight of a horse. Notwithstanding the extreme care exercised in making the descent, three animals fell off the trail, and rolling over once or twice swiftly descended the snowy sides of the pass for 300 yards.

As I advanced I found considerable evidence of iron in the small streams. The trail from the summit of the pass for a distance of 25 miles developed some very good railroad grades. About 12 miles distant, N. 72° W., is a very large mountain, which I estimate to be 9,986 feet in height. It stands practically alone, there being a range of low hills running southwest from it. The north end of the mountain is steep and rugged and breaks very abruptly, leaving a big gap between it and the hills extending northeast. The Sushitna River undoubtedly runs through the gap. We called this elevation Mount Duchesnay.

The valley now opened out into a low, hilly country.

We camped on the Sushitna River July 4. We found good grass all along the stream. We panned the sand and found some colors, but nothing very promising. Near our camp we discovered some strong sulphur springs, which were located on the bank of the river. On July 13 we struck Captain Glenn's trail of 1898, and followed it until we struck the headwaters of the Delta River, where we camped on July 15. As my orders were to explore for a practicable pass at the Gerstler, Johnson, or Robertson rivers, east of the Delta Pass, we paralleled these mountains, keeping as near as practicable and watching for any break or waterway which would afford a possible means of crossing. After traveling a distance of 8 miles through a rolling, hilly country, we struck a wide, deep canyon, having very steep sides and carrying a small stream.

The course of the stream was in a northwesterly direction toward the Delta River. After traveling about 8 miles we crossed a canyon, and 6 miles farther on we reached a large lake, which I called Glacier Lake. (9.) This lake is from 12 to 15 miles long, extending northwest and southeast, and is from 4 to 5 miles across at its widest point. Its north end lies right up against an immense glacier at the foot of the Alaska mountains. There is one large and a number of small islands in the lake, and it appears to be a growing body of water, simply an overflow from the glacier, which overflow is pushing its way up among the hills, filling all the hollows and ravines.

The south end of this lake is certainly of recent origin, as it has no beach, the grass growing down to the water's edge and some small, dead trees standing in the water. It has the appearance of a "fill in" rather than a natural lake bed. It is only one-fourth of a mile wide at this end. The water is very cloudy, having a light bluish tint, but does not appear dirty or full of sediment. There are fish in this water, as I succeeded in hooking one which weighed one and one-half pounds. This fish had big eyes and mouth, small scales, dark back, mottled sides, reddish fins on the belly, and the meat was of a yellowish color. This was evidently a sort of lake trout. It was not at all gamy.

Rounding the south end of Glacier Lake (10) we soon came to its outlet, a roaring stream which could be heard 3 miles away. This stream runs S. 30° E., through a deep canyon, which can only be descended at certain places. The stream is divided into three or four channels, each 20 to 30 feet wide and 2 to 3 feet deep, and is very swift and rocky. We saw a few red salmon here.

After crossing, we began to climb again, getting into a very hilly country. From the top of one of these hills, in looking down the stream, we could see a beautiful expanse of water, about 10 miles away, estimated to be 10 miles long and 3 or 4 wide. This is a picturesque looking lake, being surrounded by high hills with thickly timbered sides sloping down to the water's edge. I was informed by a miner, later on, that this stream and lake is the Tazlena River and Tazlena Lake, but this information does not agree with the position of the above-named waters on the maps.

We next proceeded up a small stream flowing into Glacier Lake. We passed several small lakes and some swampy places, and found more evidence of iron, the water in places being highly mineralized. After traveling 5 miles we reached the watershed between the Tazlena and Gakona rivers. On descending the watershed we came to the valley of the Gakona. The Gakona is a mighty river and heads in a big glacier at the foot of the Alaskan Mountains. (11.) The water of the river is very swift and dirty, and some iron ore and copper-stained quartz were found along the river banks. Some fine gold was also discovered by panning.

In due time we descended into the valley of the Chestochena River. The Chestochena (12) heads in a glacier 6 miles north of where we crossed, and is very similar to the Gakona River, only it is not so wide and does not carry so great a volume of water. The course of the Chestochena is the same as that of the Gakona. The distance from the Gakona to the Chestochena is 12 miles. Two miles from the Chestochena we crossed the Chesna River.

I was shown some samples of gold, also of coal, that had been mined on the Chesna River by some prospectors. The coal came from a perpendicular vein, 2½ feet thick. The mountains about the Chesna River are all reddish in appearance. One of these mountains I called, Red Mountain. It is claimed that this red rock carries gold, but it appeared to me to contain more iron than anything else. "Chesna" means "red." From the Chesna to the East Fork of the Chestochena the country is high and hilly with no timber, nor swamps, and there is to be found very little moss.

Our course was now toward the Slahna River, which we reached without adventure. On this stream we found the Dawson boys' camp, named after Dawson, Minn., from which place the Dawson boys came. Prospectors formerly called this stream Sullivan Creek. It is a very dirty stream. The Slahna comes between high mountains on either side, which present the same red formation. We reached the Tok River, at the mouth of that stream, on July 27. The Tok is a dirty, glacial stream. It heads on the north side of the Alaska Mountains, and at its source starts northeast, gradually changing until it flows S. 70° E., at a point 15 miles below its source.

We struck the Mentasta trail on July 30, just across from the mouth of the Little Tok. We were now on an old trail and had good traveling to the Tanana River, which point was 30 miles from the Little Tok. The Tok Valley (13) widens out into an extensive flat country and is heavily timbered. The Tanana Valley for 8 miles before reaching the river is as level as a floor. It would make a good bicycle road. We found absolutely no water for a distance of 20 miles before reaching the Tanana. There were a great many old camps between the Tok and Tanana rivers, which had been made by tenderfeet gold seekers following the great Klondyke rush, and there were also to be seen quantities of abandoned paraphernalia, such as clothing, etc.

On August 2 we ferried our goods across the Tanana (13b). Soon after crossing the Tanana, we met a party of prospectors from the extreme head of the Tanana, who had come down the river. They had not tasted sugar for a long time. In this party was Mr. H. S. Conger, of Mora, Minn., who had been afflicted with scurvy and was still quite lame and unable to walk much, and Mr. W. J. McGee, of Pueblo, Colo. These gentlemen accompanied us to Eagle City.

Lake Mansfield was reached, without many incidents worth mentioning, on August 3. Here we found a Tanana Indian village of about 65 inhabitants (13D and 13E). All the men and boys were out to meet us. These Indians were very friendly, and wanted to buy tobacco before everything else. They would, however, buy tea, sugar, guns, and ammunition. They all seemed to be supplied with money and offered big prices for anything they wanted. They were very intelligent, and all the young men spoke good English. A very noticeable feature was the healthy appearance of these Indians, which was in striking contrast to so many Alaska Indians, who are afflicted with hereditary diseases. I only saw one in the village who was not healthy in appearance, and this one was an imbecile and possessed no evidence of hereditary disease. They told us, however, a great tale of woe of how many Indians had died, from which we understood that some epidemic had afflicted them. Their chief was dead, and when asked how they would get another, said, "by em by he come," meaning that the priest would appoint a chief for them upon his next visit.

Near our camp on the Tanana was Fish Creek. This stream is full of whitefish, ranging from three-fourths of a pound to 2½ pounds in weight. We saw a pickerel, which was caught in this stream, that weighed 8 pounds. This is a game fish and will take bait. The whitefish has to be netted or trapped. We also saw a few suckers.

In due time we crossed Ketchumstock Creek, where there is another Indian village. After traversing a distance of 12 miles we struck Gold Creek. The country from Gold Creek to Ketchumstock Creek contained very extra-fine high grass. It had a long head of yellowish seed, stood very thick, was from 2 to 3 feet high, and looked like a big grain field. It was rich in seeds and proved to be excellent feed for stock. The country hereabouts possesses plenty of game and is a favorite hunting ground for the Indians. We saw many old camps and great numbers of caribou horns, bones, and skin, and some fine specimens of antlers that were hung in trees along the trail.

From this point we soon reached Franklin Gulch, which is a very small stream running through a narrow canyon, and is about 5 miles long. "The Gulch" has been mined for a great many years and some snug fortunes have been taken out of it. We saw a number of men at work with sluice boxes, although water for sluicing was very scarce. The miners were "sniping" on deserted claims, simply trying to make a stake. Some days they would take out only a couple of dollars, and on other days their labors would be rewarded by pulling out $10 or $15. Some of the miners showed us a nugget worth over $50, and we saw a number worth from $2 to $10. The miners claim that the gold is worth $16 per ounce; they also claimed that Napoleon Creek gold was worth $18 per ounce. En route we heard of a "strike" on Jack Wade Creek, which is a short stream heading a little east of South Fork, and flowing in a southerly direction into Walkers Fork. We met a number of miners who were going to Jack Wade.

On August 14 we reached Forty Mile River. From this point we proceeded to Dome Creek, near its head. From Dome Creek we proceeded northward, crossing O'Brien Creek, near its head. Before we had traveled far we could see the breaks on the Yukon and could easily locate them. Eagle City was reached the next day. Circle City was reached August 29, and Rampart City, August 31. On September 2 the expedition was at Holy Cross Mission, a beautiful little garden spot about 390 miles from the mouth of the Yukon. Here is located a Catholic mission, a school for Indian boys, and a separate one for the girls. We visited the schools and were very much interested in seeing the Indian children, who were orderly, and well and neatly dressed, greatly contrasting with the Indians usually seen throughout Alaska. (14.) We saw some very fine gardens here, which were a great surprise, growing as beautiful flowers as one sees anywhere; also cauliflower, cabbage, and potatoes equal to any grown in the States. St. Michael was reached September 4. (15.)

While at St. Michael we heard of the wonderful Cape Nome, and met many people from Dawson and other points who were going there. On September 12 we reached Cape Nome, also known as Anvil City. The town is located at the mouth of Snake River, several miles west of Cape Nome proper, and is built on the beach just above high tide. Its name is derived from an anvil-shaped rock which stands on the top of a hill several miles back from the beach and town.

We found Anvil City a very lively place of about 2,500 population. Many frame buildings were in course of erection which, with other improvements, mining, etc., afforded labor for all hands. Wages were $1 per hour and there was no excuse for anyone to be idle. An election was being held that day for sheriff, and some other offices, and my vote was solicited, but I declined to exercise that doubtful privilege thus accorded. Several of the large commercial companies doing business in Alaska already had good stores established here in substantial buildings covered with corrugated iron. There was the usual number of saloons, restaurants, and lodging houses, all doing a lucrative business. Lieutenant Craig, U. S. A., and 20 enlisted men were stationed here for the maintenance of law and order.

The beach from Anvil City westward was dotted with miner's tents as far as the eye could reach, and we were informed that gold had been found for more than 60 miles along this beach.

I personally visited the miners at work, conversed with them, and watched their process of washing the gold from the sand. Some work was being done below high tide, although it was principally carried on above that mark.

The tools used were simply a shovel and rocker. The modus operandi being to clean off a space of 20 to 25 feet square, removing the coarse sand and gravel until the "pay streak" was reached. This was carefully scraped up and piled separately, to be washed later. The "pay streak" was very thin, in some places being only a fraction of an inch thick, while at others it was several inches thick. The rockers used were of various models and many of them very crude affairs. Water was obtained by small hand pumps in a few instances, but in the main by carrying it in buckets from the sea or by constructing small dams that filled up when the tide flooded.

There were a few sluice boxes in operation, water being secured by pumping from Snake River. However, this process was not common, as it was difficult to obtain the water necessary. We saw one dredger at work in Snake River, taking the sand from the river bottom and catching the gold by a sluicing operation. Sample of "pay streak" sand was obtained from one of the miner's dumps. This is called "ruby" sand, because so many of its particles resemble the ruby in appearance.

It was difficult to secure accurate information from miners at work. They appeared to be tired of answering questions, or, perhaps, they were supicious that their claims might be "jumped." However, from the best information obtainable, it was learned that men who would work had taken out not less than $10 per day, and the average had been much more, some fabulous sums having been taken out.

We sailed from Anvil City September 13 and reached Homer (Cooks Inlet) October 23.

TOPOGRAPHICAL FEATURES.

Looking northward from the head of Knik Arm, the country appeared very mountainous, giving no indication of an easy passage. However, as one travels in this direction, following up the Matanuska River, a wide valley opens up between high hills, and the mountains are seen some distance back. The Matanuska Valley is heavily timbered, and well watered by a number of creeks coming in from the west, Chicaloon Creek being the largest of these. Near the mouth of this stream the Matanuska turns toward the east.

The valley of the Chicaloon is very narrow, with high hills on either side. As the source of this stream is approached, the valley narrows down until nothing remains but the wide creek bed. This stream heads on the south slope of the Talkeetno Mountains. Just opposite on the north slope the Talkeetno River has its source. This last-named river flows northwest and is one of the principal tributaries of the Sushitna River, into which it empties just below the junction of the Middle and West forks.

From the Talkeetno Mountains northward to the Sushitna River the country is low, with rolling hills, and grows no timber except along the river. Where we struck the Sushitna (about 62° 40′ 00″ north latitude and 147° 20′ 00″ west longitude) its general course was nearly true west, although it was a very crooked river running between high, steep, and heavily timbered hills. This Middle Fork is a large river and drains a vast expanse of country lying north of the Talkeetno Mountains and extending as far east as Lake Louise.

Proceeding a little north of east, the divide between the Sushitna and Copper rivers is reached in latitude 62° 50′ 00″ N.; longitude 145° 40′ 00″ W. In latitude 63° 00′ 00″ N., longitude 145° 008′ 00″ W. there is another divide where the water flows north. This is the head of the Delta River, which flows to the Tanana through a wide gap in the Alaska Mountains.

The Alaska Mountains extend from the Delta River eastward for 50 miles, where they run out. This range is very high, rugged and precipitous, and is snow-bound and glacierized the whole distance. The peaks are pure white, the snow extending down the sides into the gulches, which are filled by glaciers. Some idea of the immensity of these glaciers may be obtained from the fact that there are six large streams flowing from them in a distance of 30 miles. All these

streams flow south and east into the Copper River. The Slahna River is the last stream (easternmost) of any size flowing from the Alaska Mountains to the Copper River.

Ten miles east of the Slahna is the Tok River. This stream heads on the north slope of the mountains and flows in a southerly direction, going completely around the eastern end of this range of mountains, when it turns toward the east and then to the north, emptying into the Tanana River.

The Tanana Valley is very level for 10 or 12 miles south of the crossing leading to Lake Mansfield. North of the river the valley is not so wide; and as the lake is approached the country becomes hilly and rolling. This hilly country extends all around the lake and for 10 or 12 miles north of it; then we strike a very level region—slightly undulating in places—extending past Mosquito Fork, Ketchumstock Creek, and nearly to Gold Creek, where it becomes very hilly. From the South Fork of Forty Mile to the Yukon River it is very hilly, the hills being high and above timber. The streams all run through deep gulches and canyons which are heavily timbered.

PRACTICABLE ROUTES.

From our own observations, taken in conjunction with the best information obtainable, it is very evident that the shortest, best, and in every way the most practicable route from the Gulf of Alaska to the Yukon River is from Knik Arm up the Matanuska River to its head, thence in a northeasterly direction, crossing the glacial streams from the Alaska Mountains near their confluence with the Copper River, and passing the lower end of Lake Mentasta, thence through the Alaska Mountains via the head of the Little Tok River, by what is known as the Mentasta Pass to the Tok (Big Tok), which is crossed just above the mouth of the Little Tok. Here our trail is struck, and from this point to the Yukon there is a good trail.

The route, as outlined, would avoid all glaciers, mountain ranges, and the crossing of the Copper River. The only difficulty to be encountered would be some swampy country, but this is not insurmountable. By this route I am confident that the journey from tide water to Eagle City (Fort Egbert) can be accomplished in from twenty to twenty-five days with pack animals.

FEASIBLE ROUTES FOR RAILROAD CONSTRUCTION.

It is difficult for one who has not spent the winter, as well as the summer, in Alaska, to make a good estimate of the practicability of railroad construction in this country. Topographically there are no great obstacles, excepting in a few places. There is generally ample room for development, so that fair grades can be obtained, and there are many miles of ideal country so far as gradients are concerned. The greatest engineering difficulties would be the crossing of swamps, bridging streams subject to great rise, and protecting the road bed from probable snow slides when crossing the pass through the Alaska Mountains. Material used in railroad construction is found throughout Alaska. Rock, sand, and gravel are plentiful on all the larger streams, and timber for ties and piles can be found almost anywhere. Good bridge timber, however, is not so plentiful, although considerable quantities suitable for this construction may be found near the coast and in the interior along some of the large rivers and on the Yukon.

TIMBER AND FUEL.

The Cook Inlet coast is heavily timbered, the principal varieties being spruce, birch, and cottonwood. Of these the spruce is much more abundant and grows larger than the others, and is consequently of more commercial value. The timber in Alaska is not large and can not be compared in size to that found in Washington, Oregon, and California. The timber area extends north up the Chicaloon Valley until near its head, where the country becomes very mountainous and timber ceases to grow. Over the divide, and about 15 miles from the summit, timber is again found in abundance on the Talkeetno River. This river flows through a beautiful valley which is heavily timbered with spruce and a few of the other varieties heretofore mentioned.

From the Talkeetno Valley northward the next timber is found on the Sushitna River.

Along this stream and tributaries is found some very good timber of the same varieties as those growing near the coast.

The swampy area lying north and east of the Sushitna River is covered with a growth of timber which is quite scattering in places, while at others it is very thick. This timber has little value except for fuel, it being mostly small and scrubby, and many of the trees being dead, or partially so.

From the Delta River eastward, along the base of the Alaska Mountains, there is no timber except along the streams. These, however, are quite numerous and each is bordered by a narrow strip of timber, which is principally cottonwood, quakingaspen, and willow, the spruce being very scarce near the head of these streams. Looking down, however, it can be easily seen that within a few miles the spruce again predominates and grows thicker as the valley becomes lower. The country along the Slahna River, and for 10 miles west of it, is well timbered with spruce and a few smaller varieties.

Following our trail the next timber is found on the Tok River, and this extends practically unbroken to the Tanana, the valleys of these rivers being heavily timbered with spruce, cottonwood, and quakingaspen.

From the Tanana to the Yukon there is plenty of timber, although from Lake Mansfield to the vicinity of South Fork it is scattering and small. As you advance from the last-named stream, however, it grows thicker and somewhat larger. All the streams and valleys are heavily timbered, the principal variety being spruce. Along the Yukon, above Eagle City, there is some good saw timber, although it has been materially thinned out by loggers who furnish the steamboats with fuel and contract for logs for sawmills along the river.

The principal fuef in Alaska is wood, and, as has been shown, this is found in abundance from Cook Inlet to the Yukon. On the inlet, however, there are numerous and extensive deposits of coal, which are utilized as fuel by steamers plying in these waters. We observed a vein of coal in the Matanuska Valley on Moose Creek, near its confluence with the above-named river. The outeroppings were not very promising, but as no development had been made, a fair estimate as to its probable value could not be ascertained. In the Alaska Mountains, on the Chesna River, 8 miles above its confluence with the Chestochena, there is a perpendicular vein of coal 2½ feet wide. This coal was used by miners at work in this vicinity and gave excellent results. The coal was shown us and appeared to be a superior article.

A number of veins of coal has been found in the interior, but very little attention has been paid to the veins because the prospector is looking for a more valuable mineral, and wood for fuel is always plentiful. Futhermore, coal is valueless here because of the lack of transportation. There are undoubtedly many rich coal fields in Alaska, which will be developed as the demand for this article increases.

MINERALS.

Gold, silver, lead, iron, and copper, while not minerals in the strictest sense, are commonly so classed and will be put under this head.

Gold is found throughout Alaska from Cook Inlet to the Yukon. On the inlet several large companies have plants in operation working placer claims. All the streams in the interior, almost without exception, carry gold in greater or less quantities. We panned nearly all the streams crossed and invariably found a little gold. Along the Alaskan Range of mountains there are some promising placer locations, near the head of the Chestochena River, and a number of prospectors was working there and also on the Slahna and Tok rivers. Traces of copper and iron were found along these streams.

From South Fork of Forty Mile to the Yukon is called the gold-bearing district. All the streams in this region have been prospected and worked, and many of them have yielded considerable quantities of the precious metal. Some excitement was created, and a small rush inaugurated, last August (1899) by a new "strike" made on the Jack Wade Creek, a small tributary to Walkers Fork. Considerable mining is being carried on along the Yukon and on the creeks emptying into it, notably on American Creek, a tributary to Mission Creek, near Eagle City.

Practically all the gold found thus far in this part of Alaska has been in placer ground, but no doubt quartz claims will be developed in the near future. A little gold quartz mining is being done on Unalaska Island, and at one time quite an extensive plant was in operation there, but it is now abandoned and in ruins, as the ore was not rich enough to yield a profit. It is claimed that there are some large deposits of sulphur on this island, but little, if anything, has been done toward developing them.

VEGETABLE PRODUCTS.

All vegetation has a very rapid and luxuriant growth, owing to the very great amount of sunlight in summer and the richness of the soil. Flowers of all colors and varieties are found in abundance from the coast to the Yukon, growing from the mountain tops to the valleys below. There are two varieties of wild peas beautiful in blossom and rich in fruit. These thrive along the sandy banks of the rivers which head in the Alaska mountains. The grasses found throughout Alaska are many. Their growth is marvelous. Some varieties attain the height of 4 and 5 feet and cover the ground like a great wheat field. The taller varieties are very nutritious, having long heads which are rich in seeds. Many smaller varieties thrive everywhere. The best known and most sought after by the stock is the bunch grass, which is found at intervals from Cook Inlet to the Yukon, and which is always eagerly eaten by the stock. Wild peas were also much sought after and greatly relished by both horses and mules.

Many varieties of berries and small fruits are found all through Alaska. The most common is the blueberry, which grows on a small bush that thrives in all latitudes and has no difficulty in forcing its way through the heavy moss. This berry is of excellent flavor, is much esteemed by the Indians, and is one of the principal foods of the bear, ptarmigan, and grouse. It is found in greater quantities and is more prolific on high hills devoid of timber. A few of the other varieties are the gooseberry, mossberry, red and black currants, huckleberry, raspberry, high and low bush cranberry, and many others which are unfamiliar to us. It is said to be a fact that none of the berries growing in Alaska are poisonous.

GAME AND FISH.

While this is supposed to be a great game country, it is very much overestimated in this respect. Grouse are found in the lowlands and ptarmigan on the high hills and mountain sides, but neither are very plentiful, and many sections seem to be absolutely devoid of them. Ducks breed in considerable numbers on some of the small lakes and ponds; also several species of snipe, including the plover, curlew, and others. Very few geese are found in the interior. On the lower Yukon, however, ducks and geese are found in great numbers in the early part of September, preparing for their migratory flight.

Of large game there is the moose, caribou, mountain sheep, goat, and several species of the bruin family, the brown and black bear being the most common, and the latter much more abundant than the former.

The caribou and moose furnish the principal food supply for the natives, the former being abundant and more easily secured. Caribou are found from the Talkeetno Mountains to the Yukon, and run in large droves in the fall. They range in a high, open country having little timber. On the other hand, the moose is more plentiful on the coast, but is found all through Alaska and ranges in the lowlands in the thick timber.

There are many fur-bearing animals throughout this country, the principal ones being the red, white, blue, black, silver, and gray fox, and the beaver, marten, land otter, mink, ermine, parkee, etc.

Several varieties of fish are found in the interior. In most of the small clear streams and lakes there are trout, grayling, and a few suckers. In some sections the trout were quite plentiful, but as a rule they are not abundant. These fish, excepting the sucker, will rise to the fly, and also take bait. Quite a number were killed with hook and line. The best fishing ground observed was at the Indian village on Lake Mansfield, in a small stream called Fish Creek, which

is the outlet of this lake. Here the Indians caught great numbers of whitefish and pike in nets and traps.

Some salmon were found near the Alaska Mountains, having run up from tide water to the head of these streams via the Copper River. They were said to be quite plentiful at Lake Mentasta, so much so that Indians went there to secure their winter's supply. They are also caught in the vicinity of Eagle City, but it is claimed they do not run very far up the Tanana. By far the best fresh-water fishing is found along the coast in the small lakes and streams which discharge into tide water. At Tyoonok, on Cook Inlet, great numbers of trout can be hooked in a short time, and on Unalaska Island there are several streams and lakes all well stocked with this game fish.

THE ALASKA INDIAN.

While there are many tribal names given to the different Indians inhabiting Alaska, they may be divided into two classes, viz, the coast dwellers and the interior Indians. The former greatly outnumber the latter and are found at every trading station along the coast. They live in small cabins and huts and subsist principally on fish. They do some hunting and trapping, trading their hides and furs at company stores for flour, tea, sugar, clothing, etc. The women make baskets, moccasins, caps, bags, and various other curios, and invade every passing steamer to sell their goods. Most of these articles are made from the skins of the moose, bear, fox, hair seal, and even aquatic birds, such as ducks, geese, swan, etc. The baskets are ingeniously woven from grasses, willows, and bark.

The coast Indians are generally of low stature and are very lazy. They lack intelligence, and are far from being prepossessing in appearance. They are afflicted, to a considerable extent, with hereditary diseases and are a short-lived people.

The interior Indians take their names from the rivers near which they live; thus they are called the Knik, Matanuska, Sushitna, Copper River, and Tanana Indians. These Indians are very few in number and dwell in small villages of log cabins, and live principally on caribou and moose, although a great many fish are also caught and dried for winter use. They hunt and trap a great deal and make long journeys to trading stations to dispose of their furs and skins in exchange for the necessary flour, tea, sugar, clothing, etc. They are of greater stature, better appearance, hardier, and of much higher intelligence than the coast Indians, and are practically free from hereditary disease.

ANIMALS BEST FITTED FOR USE IN ALASKA.

My observations were confined to the open season, when the reindeer and dog are not generally used. The mule is conceded to be a hardier animal than the horse, being able to endure greater hardships, more abuse, and to move heavier loads. However, he is much more excitable, and consequently unmanageable at critical periods. He is a poor rustler for grass, and having small hoofs, not so well adapted for crossing swamps as the horse. Our experience was with 10 mules and 7 horses, and the latter stood the work about as well as the former, all being loaded with an average weight of 250 pounds each. Nearly all our trouble in crossing swamps and dangerous places in the mountains was caused by the mules. Horses would stand in their tracks until told to move, while the mules would become excited and unmanageable, crowding and pushing each other off the trail, each trying to occupy the place in which some other animal stood. They are, however, faithful animals, and will follow their leader anywhere.

The superiority of the horse over the mule in Alaska is because he is more intelligent, a better forager, much less excitable in dangerous places, and at critical periods more easily managed, and better fitted for crossing swamps, on account of his larger hoofs. And while he may not be quite equal to the mule in carrying capacity, he will stand a good load, and in my judgment is preferable to the latter.

CLIMATE.

The climate of Alaska is very fine throughout the summer months from the Gulf to the Yukon. In June and July the sun shines from eighteen to twenty hours a day, and the days are warm and pleasant, but never oppressive. The nights are cool, but not cold, except in the mountains.

There is not much rain in the interior during the summer months, except along the mountain ranges, where there is considerable rainy and cloudy weather.

FROM MIDDLE FORK OF SUSHITNA RIVER TO INDIAN CREEK.

By Dr. GEORGE B. THOMAS.

My itinerary began June 22, 1899. My point of departure was on the west bank of the Middle Fork of the Sushitna River, about 10 miles above "The Forks." The latter are about 100 miles from Cook Inlet. The Van Schoonhoven detachment accompanied me in the expedition which I was to undertake.

Our first objective point was the mouth of Indian Creek, on the Sushitna River. From this point our route was up Indian Creek and over a divide to the waters of the West Branch of the Sushitna. From thence we crossed the main divide to Jack River, which is a tributary of the Cantwell River. From the point arrived at on the Jack we crossed a local divide to the Gengro River; from thence we passed over another local divide to a river (the Bradley) which flows in a northerly direction to the Tanana. From this point we proceeded north along the banks of the Tanana for a distance of about 25 miles. I calculated that the distance traveled up to this time to be 195 miles.

It required forty-seven days to travel the distance from our first camp on the Sushitna to our northernmost camp on the Tanana. Some of the horses were under pack seventy-four hours. As to the practicability of regular travel along the routes gone over by the Van Schoonhoven detachment, my opinion is that the section traversed from the Sushitna River to Knik Arm is not a good one for summer travel, as most of the country is too swampy. Were the swamps met with on the trail leading from "The Forks" to our last camp on the Sushitna River corduroyed the trail would be greatly improved. If relay stations were located along the line of the trail, mail could be delivered from the Sushitna River, at the mouth of Indian Creek, to the Tanana in three days, and during the long days in summer in two days. From information received, a pack train could be taken from our northernmost camp to the Tanana, and it would be an easy matter for light mail riders to pass over the trail.

A Mr. Cox, who has passed over the trail, informed me that a pack train could be taken down the west bank of the Cantwell River to the Tanana, which latter could be easily crossed. He also stated that a good horse trail could be made along the north bank of the Tanana to the Chena. He further stated that he knew that for 100 miles along the Chena there could be found better traveling for a horse than through the country over which we had passed. From these statements it appears that a trail is practicable for a distance of 425 miles, from the Sushitna to the Yukon, over which a pack train could travel in less than two hundred hours and over which mail riders could travel in less than one hundred hours.

My observations of weather conditions extended from June 21, 1899, to October 12, inclusive, and covered a territory extending from Cook Inlet to the Tanana River. There were two particularly noticeable facts about the weather: First, after it had been raining for several successive days it would suddenly clear up and within a few hours it would seem as if there had not been a recent rain. I was struck with the sameness of weather conditions during the latter parts of June, July, August, and early September. The season from June 21 to September 21

seemed to be nicely balanced. After the last-named date there came an abrupt change and winter seemed to have suddenly set in. The first snow we saw falling was merely an incident. It was on August 22, as we were coming over the West Sushitna—Indian Creek Pass—that snow fell. The nights were cool enough to make one glad to have blankets. The fair days were comfortably warm, and the rainy days were not uncomfortably cool, except on the mountains. There were no uncomfortably warm or uncomfortably cold days up to September 21. The fair days reminded me of the Indian summer days of the Ohio Valley.

I am not enthusiastic over the agricultural and timber possibilities of the section of country I traversed. I sowed some oats at Evansville in June; in August the crop had a nice stand. Van Schoonhoven and other members of the expedition, all of whom have done practical farm work, agree that the country along the banks of the Sushitna, barring the swampy places, will grow all cereals except wheat. The seasons are too short and there are not enough hot days for wheat or corn to fill. Pumpkins, squashes, and melons would not mature. Some of the hardier apples might do well. Timothy, clover, and millet would flourish, but it would probably be difficult to cure hay, on account of the frequent rains. Buckwheat and flax should do well. Of small berries the soil grows numerous varieties.

The land best adapted for farming is to be found along the Sushitna River and in the lower Indian Creek country. Upper Indian Creek and the land from there to the Cantwell is too high and rocky for agricultural purposes, the soil being sticky and clayish. The valley of the Gengro is too narrow to admit of much cultivation, although the soil is rich and the land slopes well to the south. The valley of the Bradley is comparatively low, but the soil is good and is well sheltered from the north winds. Cereals, berries, and grasses would probably do as well in these two valleys as in the Sushitna valleys.

There was a sameness of vegetation along the Sushitna River, Indian Creek, and Jack, Cantwell, Gengro, and Bradley rivers.

There were spruce, cottonwood, and birch trees; black alder, willow, and buck brush; redtop, meadow, and swamp grasses; a few wild flowers, mostly roses; moss, principally of two kinds—the thick, tough moss of the lowlands and hillsides, and the gray or white reindeer or caribou moss of the mountains.

Vines and rank weedy vegetation were noticeably absent.

Spruce ran all the way from a few feet to 80 feet in height. Most of that which we saw was from 20 to 40 feet high and of small diameter; rarely did we see a tree of 20 inches in diameter; probably 9 inches was the average. Occasionally we would see a cottonwood from 3 to 6 feet in diameter, but most of them were small or of medium size; probably 16 inches was the average. The birches were all small or of medium size.

We saw no large willows; most of the willows were merely brush, and we would sometimes find them on the mountain sides, even above where the alder had ceased to grow.

THE ANIMAL LIFE OF THE COUNTRY AND FOOD CONSUMED.

One was struck with the comparative absence of animal life. There were no birds that could be called song birds. Occasionally, a half dozen or more small dirty-yellowish birds, about the size of English sparrows, would come about camp, twitter for a while, and then disappear. About one-half of our camps was visited by the camp robber, a bird resembling the catbird, but having a larger and rounder and more fluffy head. They came generally in pairs—sometimes three. They seemed devoid of fear, would light on the dishes, steal something, fly away and cache their plunder, and return immediately for more; they were nuisances. I saw about six owls in four months, and only two eagles. I saw no geese after leaving Tyoonok, and ducks were rarely met with. Except a flock of about twenty ducks, seen on the Sushitna in September, and three mothers with their broods seen on Indian Creek in July, I did not see more than a dozen ducks. The seagulls were ubiquitous; we did not see many of them at one time, but one or two could generally be seen at any time, even when we were on mountains 250 miles from the coast. Occasionally we saw a few snipe along the streams and lakes.

The most plentiful birds we met with were the ptarmigan. These we saw in numbers from Indian Creek to the Tanana, and even on the high mountains where there was little or no vegetation. They were raising their young in July, but in August we found them to be good food. Next to the ptarmigan, we saw more blue grouse or spruce hens. They were plentiful on Indian Creek and the Sushitna in August and September, and certainly were a table treat. Both the ptarmigan and blue grouse are said to live exclusively on spruce needles in the winter. We found that in August the blue grouse lived on berries—mostly cranberries—but in September they had already begun to add spruce to their diet.

MINERAL RESOURCES.

Our detachment was so intent on getting to the Tanana that very little time was spent in prospecting. We saw evidences of iron beyond Cantwell, but did not stop to investigate thoroughly. We saw outcroppings of coal at several points along the Sushitna, notably about 7 miles above the forks and about 4 miles below. It is a low grade of lignite, burns fairly well, leaving considerable blue ash. The main objection to it is that of bulk; a quantity sufficient to produce the required amount of steam within a given time takes up too much room.

It is a noteworthy fact that Tyoonok is probably the cheapest tide-water coal market on earth. While it can not be said that the coal is just what could be desired for bunker supply, the fact that any coal suitable for steaming purposes can be delivered at a ship's side for $1 per ton renders this Alaskan port unique. This coal is taken from a 6-foot vein that crops out on the east bank of Cook Inlet, about 5 miles south of Tyoonok. It contains: "Moisture, 5.41; volatile matter, 65.13; fixed carbon, 27.60; ash, 1.86." The Indians dig it and bring it in small boats to the vessel's side at Tyoonok.

THE LOCATION AND CONDITION OF THE NATIVES.

There are about 175 Indians at Tyoonok. Were they more provident and industrious they could become fairly prosperous. They have fish in abundance, but they put up very little for winter use; coal is washed up on the beach by every tide; vegetables are easily grown on the hillsides. The Indians are close enough to the game country to profit by hunting and trapping. However, they just work enough to barely keep themselves poorly fed and clad—depend largely on odd jobs; handle freight from steamers in the summer, and dig and boat coal to the steamers from the mines about 5 miles down the inlet. They are all in bad physical condition. Most of them have had opthalmia neonatorum, and many of them are now suffering with trachoma (granulated eyelids); many of them are "ricketty;" about one-half the deaths among them have been preceded by pulmonary hemorrhage.

At Knik there are about 100 Indians. They are more provident than the Indians at Tyoonok, and do quite a good deal of hunting and trapping, as well as handiwork in skin garments, snow shoes, baskets, and the general run of Indian curios. Their general physical condition is also better, but the same can be said of them as to pulmonary affections.

There are about 150 Indians at Sushitna Station. They are about the same grade of Indians as the Kniks. They live by fishing and hunting; most of them die of tuberculosis.

At Croto Creek, about 15 miles up the river from Sushitna Station, are about twenty Indians. They are intelligent, healthy, and dress as if they were in good circumstances for Indians. They were nearly all away fishing when we stopped there. The amount of fish hung up to dry showed that they would not go hungry this winter.

FROM MIDDLE FORK OF SUSHITNA TO THE TALKEETNO.

By Sergt. WILLIAM YANERT, Eighth Cavalry.

In starting out on my expedition from the Middle Fork of the Sushitna River, July 14, 1899, my instructions were to proceed to Gold Creek and move toward the head of Talkeetno River. Once at the head of that stream I was to endeavor to find the trail down the west side of the foothills to Sushitna Station. From that point I was to proceed to Tyoonok, blazing a trail as I proceeded.

On July 18 we were in sight of Mount McKinley. On July 20 we reached Gold Creek. On July 30 I crossed a stream within 50 yards of the southern shore of a lake which I had reason to believe was Lake Talkeetno. From this point we pushed toward the range of mountains on our front, that resembled the range which I saw last year at the head of Talkeetno River.

On August 12 we got down to the Talkeetno River, following a creek that bears the name of Aspen. On August 14 we reached Paradise Point, at the head of the Talkeetno. The following day we camped at the head of Chicaloon Creek. On August 19 Young Creek was reached, and King Creek was forded. On the following day we reached Moose Creek, and on August 22 we reached our starting point again with horses and men in fairly good shape, except that some of the latter were practically barefooted. The distance traveled in our itinerary is estimated at 227 miles.

A QUEST FOR THE TANANA.

By GEORGE W. VANSCHOONHOVEN.

The starting point of the detachment which I commanded was the Middle Fork of the Sushitna River. My ultimate objective point was the Tanana River. We arrived at Indian Creek, on the Middle Forks of the Sushitna, July 4. The country over which we passed for the first three days was swampy in part and mainly consisted of low, rolling hills. The latter were timbered with spruce, birch, and cottonwood, with an undergrowth of black alder, and in the more open parts with willows. Grass was found in abundance throughout the valley, and in places it was found growing as high as a man's head.

The soil in the lower country is a black, rich loam, over which lies a yellow or gray clay. The nature of the country required a great deal of ax work. The country at the mouth of Indian Creek, and for several miles around it, is well watered and is amply supplied with timber, while the grazing at the time we traversed the country was good.

The valley of Indian Creek is similar to the main Sushitna River Valley, although somewhat rougher when it approaches the mountains. On July 21 we arrived at Jack River. More than half the distance traveled was treeless, and consisted of barren tableland. We followed the course of Jack River, the valley of which is very narrow. The Jack River country is a good one for game, and the Sushitna Indians make this their hunting ground for caribou and sheep.

On July 26 we reached the Cantwell River at a point 82¼ miles from the mouth of Indian Creek. We subsequently crossed the Cantwell, and found the valley of that stream quite heavily timbered with spruce of fair size. We also found plenty of grass in the valleys of all the small streams coming from the mountains into the Cantwell. About 15 miles from the Cantwell we made an examination of a pass, but found on its opposite side a glacier, which made any attempt to cross to the opposite valley impracticable. Nine miles distant we found a good pass to the northeastward, and this we called Big Horn Pass, on account of the big-horned sheep that we found there. At this point our Indian guides deserted us, and we had to rely thenceforward entirely on our own resources.

On August 1 a small mounted party under my command traveled a distance of 35 miles to a point where we could see down the open valley of a stream whose waters flowed into the

Tanana. Four days later we proceeded toward the Tanana. Fifteen miles to the east we crossed a large river that headed in a glacier. The stream empties into the Cantwell River. The bed of this stream was, at the time we visited it, a mile in width, one-third of which was taken up by swift channels flowing among numerous sandy islands. We called this stream the Gengro. This valley has very little grass, and the growth of spruce and black alder is heavy. Game, such as black and brown bear, moose and caribou and sheep, are plentiful in the mountains on both sides of the valley.

About 14 miles beyond the Gengro we struck another river about half its size and similar to it. This river flowed to the eastward, where we struck it, but made a sharp turn to the northward a short distance down the river. We followed down its west bank for 16 miles and then crossed it on August 8. As it bore strongly to the northwest, we followed it for about 28 miles until the foothills ran out. At this point the country bore evidence of having been overflowed within the past few days, and our horses had much trouble in getting through the quicksand. On this account we abandoned the river and camped on one of a cluster of knolls. On a high knoll to the northward we got a good view of the country beyond us, as far as the Tanana River.

As the country beyond seemed impenetrable we decided to turn back. The trail up to the point to which we advanced can be made a practicable one with but little work. It was well marked by us as we blazed trees and drove stakes and placed monuments of stone in the open country. The brush and logs have been cleared out so that a pack outfit would have little or no chopping to do in passing over it. The pasturage all along the route is abundant for any number of stock, and the wood supply, with few exceptions, is ample for cooking purposes. The last 60 miles of the trail seems to be well mineralized, and affords an excellent opportunity for the prospector. Plenty of pure water can be found along the route, and parties traveling through the country can depend upon wild game for their fresh meat supply.

On our return we reached Knik October 12, 1899.

A STORY QUICKLY TOLD.

By Sergt. FREDERICK MATHYS, Company E, Fourteenth Infantry.

The object of my expedition was to find a trail down the west side of the foothills to Sushitna Station. I began my trip July 14, 1899, my starting point being the Middle Fork of the Sushitna River. By July 18 we had traveled a distance sufficient to be able to see Mt. McKinley. On July 20 we reached Gold Creek. Gold Creek is a very wild stream and fordable within 4 miles of its mouth. As far as I could see it flows due west.

On July 28 we entered thick timber lying in a basin that extended 100 miles to my front along the Sushitna River, and which was over 50 miles wide. Three large lakes besides a number of small ones dotted the basin. The largest lake is over 4 miles in length by about half a mile in width.

On July 30 we crossed a stream within 50 yards of the southern shore of a lake, which I have reason to believe was Lake Talkeetno. On August 12 we reached the Talkeetno River, and on August 14 we reached Paradise Point, at the head of the Talkeetno. On August 15 we camped at the head of Chicaloon Creek, and made the divide without any mishap. On August 19 we reached Young Creek, which we forded. On August 20 we traveled as far as Moose Creek. On August 22 we reached Camp Glenn. Nearly every man in the party came in practically barefooted. The total distance traveled to the headwaters of the Talkeetno River is estimated to be 227 miles.

SALMON FISHING GROUNDS AND CANNERIES.

By Capt. CHARLES P. ELLIOTT, U. S. A., Retired.

In making my report on the salmon fishing grounds and canneries from and including Prince William Sound to Nushagak, Bristol Bay, Alaska, I will state that I left Tyoonok on June 15, 1899, for the Kenai cannery. At this point I found that the run of fish was very light. At the mouth of the Kenai River are traps on either side and both are on the inside of the well defined bar at the mouth of the stream. I found that the method of catching fish at this point is not only very destructive to them, but is contrary to law and should be stopped.

I found the Kusslof cannery to be a thoroughly well equipped plant. If the bar defines the mouth of a river, the traps used here are in violation of law and common sense, if the fishing in the future is to be protected. I visited the Odiak cannery, 4 miles east of Orka, and found that some of the fish used in the cannery are caught in Eyak Lake, just back of the cannery. I am compelled to describe this as a wanton and inexcusable destruction of fish, and in direct violation of law.

The fish caught for the Orka and Odiak canneries are procured in the various sloughs of the delta of the Copper River. I also found that the Pacific steam whalers carry fish to the canneries that are caught in the rivers, sloughs, and lakes, and which are taken by nets set and drift. In most cases the nets are laid so that it is barely possible to get through them with a boat, and occasionally, in order to get up the river, the boats have to pass entirely over the nets. Had nature not provided on so large a scale for the protection of the salmon, the last fish would soon be caught without any regard to the future of the industry.

It was reported to me that Pacific steam whalers had fenced streams in Prince William Sound, and I have no reason to doubt the statement. The cannery of the Hume Brothers & Hume, and the Pacific Steam Whalers at Uyak Bay, as well as that of the Alaska Packers Association at Uganuk, all get fish from Alognak Island, a Government reservation, where they are strictly forbidden to fish. There is no inclination on the part of the canneries in Alaska to obey the laws or orders of the Fish Commission. As far as I could see there was no pretense to do anything except to catch fish in whatever way they could.

The fish for the cannery at Chignik Bay are caught in the bay and river in traps. The traps are laid in such a way that it seemed marvelous how any fish got past them. The run of fish at this point is large and the catch in proportion, but the increase in the amount of gear used is largely out of proportion to the number of fish taken; though the same number may be caught as formerly, fewer escape, and it is only a question of a short time before the place will be fished out.

The special fish commissioner, during the summer of 1899, ordered that certain traps, placed clearly in violation of law, should not be used. The boat of the special fish commissioner was hardly out of sight before a load of fish from these same traps was brought to the canneries and packed.

The Nushagak is a fine salmon stream, and is fished by the Alaska Packers Association, the Pacific Steam Whalers, the Alaska Fishermans Association, and Whitneys salting station.

The Alaska Packers Association had, when I was there, an immense trap well inside the mouth of the river. It was reported to me that 700,000 fish had been killed and wantonly destroyed, it being impossible to can or ship them off before they would spoil. I saw a large lighter full of fish, waiting to be removed to a cannery across Bristol Bay, which was still there when I went out, no steamer having come in for it. The Alaska Packers Association have located every available cannery site on Nushagak River for the purpose of keeping out all competitors. I am informed that the plant erected by the Pacific Steam Whalers in 1899 paid for itself in one season's pack.

In the Karluk district of the Alaska Packers' Association there are nine canneries standing. Four of these are working, three at Karluk and one at Uganak. There are 250 whites employed, 400 Chinamen and Indians, at an aggregate cost of $3,000 per year. The whites get $25 per

month and 18 cents a case; the Chinamen work by contract at 40 cents a case. The principal fish caught are red salmon; only a few king fish are captured. The fish are caught in seines at Karluk and in traps at Uganak. The fishing season commences June 12 and ends the latter part of September. The canneries at these points were prepared to pack 150,000 cases in 1899 if the fish came. In former years these canneries used to pack 300,000 cases. In 1898, 94,000 cases were packed, and in 1899, as near as I can ascertain, 50,000 cases were packed. This record speaks for itself.

During the short time I was there I saw a seine drawn directly across the mouth of the river; and, when the fish are running, this is done in such a way that the river might just as well be dammed. Fish caught by Indians in the river are sold to the canneries and packed. It was reported to me that fish caught presumably for the hatchery located at this point were also packed. The canneries employed two steamers and four steam launches in their business.

At every station I visited there was more or less illegal fishing on the part of all the large companies, the degree of wrongdoing being in proportion to the size of the company and its opportunity. The most wanton destruction of fish occurred in Cook Inlet, Prince William Sound, Algonak (a Government reservation), Kadiak Island, Chignik Bay, Nushagak.

The Alaska pack is worth about $5,000,000 a year. Canned salmon is an important food product, and the industry should be perpetuated and protected. From careful observation and inquiry, in my opinion the fishing in Alaska will be destroyed within ten years unless protected by stringent and immediate measures. An officer, with full powers to act and arrest, should have charge of all canneries in Alaska, with deputies at various points. The chief should have a sea-going boat absolutely under his orders, with sufficient force on board to carry out his orders. His deputies should be made entirely independent of the courtesy of the cannery people, and should have launches of their own to visit the fisheries at all times.

The arrest of one cannery superintendent and taking him to Sitka, and the forcible closing of one cannery, would tend to check the flagrant violation of law and defiance of authority, and, before they could communicate with their powerful friends in Washington, the lesson would be taught them and the season closed. The time for harmless warnings is past.

As regards the perpetuation of the industry, I should advise the establishment of a Government hatchery on Eyak Lake, where the Alaska Packers' Association is now fishing illegally; also a hatchery on Alaganak Island, and its retention as a Government reservation and proper protection as such. For every fish taken the packers should be required to turn out from private hatcheries a certain number of fry—from three up—or, not having a hatchery of their own, to purchase an equal number from the Government hatchery.

The large companies should be prevented from getting possession of all available cannery sites to the exclusion of the small holders. There is at present no law in Alaska and no one capable of enforcing it if there were laws. A law-abiding man has no protection from the lawless on whom there is no restraint. There are many and valuable undeveloped resources in the Territory, and the time is ripe to give it adequate protection.

INDIANS ON THE COAST OF ALASKA,

[To the west of Copper River.]

ON PRINCE WILLIAM SOUND.

Eyak or Odiak Village.—Cross between Aleuts and Kayak, more like Copper River. Total population, 59. Only 3 births in 4 years. Language distinct. Call themselves "Agalignuite."

Tatilak, near Valdez.—Population in 1894, 105 men, women, and children. In 4 years increased 12. Taller, hardier, more thrifty, better houses, less disease. Live on game and fish. Aleuts.

Kaniklak, Aleuts.—From Tatilak about 30 miles on mainland. Population in 1894, 69. Increase 3 or 4 in 4 years. Not as high, physically, as above. Live on game and fish. From 1894 to 1898 built houses to replace huts.

Chaniga, Aleuts.—On Chaniga Island, about 5 miles from mainland. Southwest end of Prince William Sound. Population in 1894, 83. No increase in 4 years. About the same racially as Kaniklak. Live on fish, whale, and sea lion. Not so good, physically, as two former.

Natchek.—On Hinchinbrook Island. Three-quarters Aleuts, one-quarter Russian. Population in 1894, 124. Six increase in 4 years.

COOK INLET.

Villages.—Tyoonok, Toyonak, Kenai, Kussilof, Munnina, Saldovia, Sushitna River, Knik River. Kenai and Tyoonok are principal villages. Total population is 1,030.

Old Kenai Village.—Indians 177—men, 66; women, 35; children, 76. Ivan Bartnosky, Russian priest,—wife, 2 children. Alexaye Ivanoff, second priest—wife, 2 children.

KADIAK ISLAND, 1898.

Kadiak: Clergy, Russian—5 males, 5 females; Russians and others—18 males, 8 females; Creoles—157 males, 175 females; Kalosh-Klinkets—4 males, 2 females.
Wood Island: Creoles—33 males, 25 females; Aleuts—17 males, 14 females.
Wozensky, on Spruce Island, northeast: Creoles—37 males, 43 females.
Kaguyak, west from Kadiak: Creoles—10 males, 9 females.
Eagle Harbor, west: Aleuts—33 males, 36 females.
Three Saints Bay: Aleuts—46 males, 29 females.
Aektalik, southwest: Aleuts—47 males, 37 females.
Pokrofsky: Aleuts—11 males, 14 females.
Akeok: Aleuts—73 males, 52 females; 3 children, males, born in 1898.
Karluk: Creoles—6 males, 5 females; Aleuts—54 males, 41 females. Thirty-six died, three born in one year.

INDIAN POPULATION, ALEUTIAN ISLANDS.

[Taken from records of Russian Church, Unalaska.]

Unalaska: Aleuts and Creoles, 310.
Makushen: Creoles, 21 males, 18 females; Aleuts, 30 males, 31 females.
Kushinga: Aleuts, 57.
Thernofsky: Aleuts, 37 males, 39 females.
Uninak: Creoles, 12 males, 13 females; Aleuts, 57 males, 63 females.
Burka: Aleuts, 32 males, 29 females.
Akutan: Creoles, 4 males, 3 females; Aleuts, 36 males, 37 females.
Sannak: Creoles, 12 males, 19 females; Aleuts, 32 males, 36 females.
Attka: Creoles, 10 males, 14 females; Aleuts, 52 males, 71 females.
Atto: Creoles, 12 males, 11 females; Aleuts, 36 males, 42 females.
On Nushagak River, about 600 Indians.
Between Nushagak and Kuskoquim, about 400.
On Kuskoquim, 2,500.
Koagyong, 300.

NATIVES IN AND NEAR NUSHAGAK.

Locality.	Male.	Female.	Total.
Nushagak, Nushagak River	63	58	121
Eknok, Nushagak River	42	37	79
Kanulik, Nushagak River	61	63	124
Knagnak and Chugiong Nushagak River	82	58	140
Alaknak, Wood River Lake	59	55	114
Tangwik, Knagnak River	98	85	183
Igaguig, Knagnak River	43	34	77
Koagyong, Kwichakh River	85	79	164
Ugashagak, Ugashagak River	107	100	207
Agishak, Ugashagak River	27	30	57
Innangashik, near Belkofsky	21	19	40
Severnofski, near Iliamna Lake	73	85	158
Lakes of Iliamna, Iliamna Village	36	31	67
Clarks Lake, Kuchik	58	48	106
Togiak, Togiak River	173	162	335
Ekallulak, Togiak River	44	48	92
Kushan, Togiak River	19	20	39
Nulatak, Togiak River	54	41	95
Kushayak, Togiak River	34	43	77
Egooshek, Egooshek River	61	63	124
Kahonak, Egooshek River	61	55	116
Alagnak, Nushagak River	102	94	196
Kashkenak, Nushagak River	32	32	64
Kakwok, Nushagak River	55	51	106
Kaligmak, Nushagak River	61	53	114
Total	1,551	1,444	2,995
Church people in Nushagak district	3	2	5
Creoles	61	65	126
Native Aleuts	216	226	442
Native Agiegmute	170	150	320
Native Kenai	78	62	140
Native Kitimute	207	191	398
Native Kuskoquim	817	749	1,566
Total	1,552	1,445	2,997
White men married to native women	17		17
Total	1,569	1,445	3,014

DEATHS IN 1898.

	Males.	Females.	Total.
Disease:			
Consumption	15	5	20
Inflammation of lungs	7	3	10
Typhus	3	4	7
Fever	3	2	5
Childbirth		2	2
Cold	11	11	22
Cough	3	5	8
Scarlet fever		2	2
Old age	5	1	6
Accidental deaths	2		2
Total	49	35	84
Age:			
Under 1 year	3	5	8
1 to 5 years	3		3
10 to 15 years		3	3
15 to 20 years	1	2	3
20 to 25 years	3	3	6
25 to 30 years	3	2	5
30 to 35 years	9	5	14
35 to 40 years	7	4	11
40 to 45 years	3	3	6
45 to 50 years	3	2	5
50 to 55 years	3	3	6
55 to 60 years	5	1	6
60 to 65 years	3	1	4
65 to 70 years	1	1	2
70 to 80 years	2		2
Total	49	35	84

GENERAL CONDITION OF INDIANS IN ALASKA.

The general condition of the Indians along the coast of Alaska is bad. They are a fish-eating race, of poor physique. The establishment of a cannery, operated by Chinamen, near one of their villages seems to be fatal to them. The Indian women stop bearing children, and men and women soon die, due largely, I think, to the use of intoxicants furnished by the Chinamen. The Indians whom I saw were much afflicted with consumption and scrofula. Many were deformed.

The Indians are under the domination of the Russian Church, and the personality of the priest in charge determines to a considerable extent the condition of the Indians. The priest at Kadiak preaches sedition against the United States, his influence being distinctly for evil.

There are two villages on Kadiak Island where the Indians had not sufficient food for the winter. I made a report to the Interior Department as soon as I returned from Alaska, but have never received a reply. The priest did not allow the Indians to work for the trading companies, and their ordinary source of supply was thus cut off.

No department of the Government has any control of the Indians. In the past this may not have been necessary, but in the changed conditions in the Territory and the rapid influx of white men it seems to me essential that the Territory should be divided into districts, and that an army officer should be placed in charge of each district with full power to aid the Indians as they may need it. The Government seems so remote to the Indians that it is not surprising they still look to Russia, through its clergy, for protection.

ALASKA.—1899.

YUKON RIVER EXPLORING EXPEDITION.

BY

Capt. W. P. RICHARDSON, Eighth Infantry, U. S. A., Commanding.

THE MIGHTY YUKON AS SEEN AND EXPLORED.

By Capt. W. P. RICHARDSON, Eighth Infantry, U. S. A.

The Yukon River has its extreme source only a few miles from the salt water of the North Pacific and flows nearly 2,000 miles before emptying its flood into the Bering Sea. Its course is northwesterly about half the length, passing within the Arctic Circle a few miles at Fort Yukon, thence turning southwesterly to its mouth. It would seem to have been especially designed by nature as a great highway for this otherwise almost inaccessible country, bisecting it very nearly for many hundreds of miles.

The Lower Yukon, or that portion between its mouth and the confluence of the Tanana and Yukon, is a majestic stream, flowing with an easy current of from 2½ to 3½ miles per hour, and varying in width, after leaving the delta, from 1 to 1½ miles. The country bordering the river, near the sea, is desolate and uninteresting, but as one proceeds into the interior it becomes slightly undulating, and from that to hilly, the hills along the north side reaching down to the water's edge, and being in places quite steep, giving pleasing variety and picturesqueness. Above the mouth of the Tanana for 150 miles the river is confined, flowing through a broken and mountainous region with an increasing strength of current, and averaging from 100 feet to a third of a mile in width.

From this point continuing up stream, one enters what is known as the Yukon Flats, which extend to a short distance above Circle, a total distance of about 275 miles. The river in this part of its course passes through many channels, with numerous islands and sloughs, averaging from 4 to 10 miles in total width.

Above Circle and up to the line of the international boundary, 80 miles, the river is similar to that section between the mouth of the Tanana and Yukon flats. The water of the river during the open season is muddy and unpalatable. During the winter it is beautifully clear and excellent for drinking purposes. Holes in the ice are kept open all winter without difficulty.

The captains of river steamers all speak of the Yukon as a river easy to navigate. There are no snags in the river, and boats can run along the shore and tie up at the bank with perfect safety almost anywhere.

Up to the summer of 1898 wood was used exclusively for firing on the boats, being furnished chiefly by the natives at $4 and $5 per cord. Timber is quite abundant along the entire river to as far down as Anvik, about 400 miles up, below which point it becomes sparse and stunted. Near the mouth of the river driftwood only can be had. Of this a considerable quantity, brought downstream by the ice and high water of the early summer, is found all along the lower river and at certain places on the shores of the Bering Sea.

The summer of 1898 saw a marked change in this feature of Alaskan business. Shortly after the river opened a representative of the Boston-Alaska Commercial Company came downstream from Dawson in a small boat and offered to engage all available steamboat wood along the river at $2 per cord. The effect on this section can be easily imagined.

It is proper to state here that this company failed generally to provide for its passengers and freight or to fulfill its contracts in other respects, and did much to unsettle trade and bring distress and hardship upon people who trusted in its promises.

The sudden rise in the price of wood and its scarcity compared to the demand caused many of the river boats to start from St. Michael with a partial supply of coal for the trip and stimulated the search for coal along the river. Several mines have been discovered since, but so far none has produced an entirely satisfactory quality of coal.

This question is an important one, as will be readily understood, and is engaging the attention at present of experts in the employ of the commercial companies. It is claimed by some that coal of high grade and good for steam purposes will not be discovered along the Yukon, as the strata are too new. It is sufficient for the purpose of this report to state that the question is, as yet, undetermined, but from the specimens I have seen I have strong hopes that the above opinion is a mistaken one.

The river boats used on the Yukon are of the stern-wheel pattern, and most all for accomodation of both passengers and freight, carrying from 150 to 500 tons of freight and drawing, when loaded, from 3½ to 6 feet. Many of the more recent ones are handsomely finished and afford all the comforts and luxuries of modern river travel. There are between thirty and thirty-five now on the river, of which fifteen are owned by the Alaska Commercial Company and the North American Transportation and Trading Company. In addition to these two companies may be mentioned the Alaska Exploration Company, the Empire Transportation Company, and the Seattle-Yukon Transportation Company, all of which are now well established and doing a rapidly increasing business with a number of good boats each.

The trip from St. Michael to Dawson, which latter place has been the chief terminus for river boats for the past two years, occupies from twelve to twenty-five days, depending upon the power of the boat and the season of the year. During June and July and part of August boats stop only to take on wood, but late in the season, as the days begin to shorten, it is necessary to tie up at night.

The ice in the river broke up at Circle in the spring of 1898 on May 12, and in the spring of 1899 on May 19. Several days elapse after the breaking up of the ice before the river clears of floating ice and driftwood sufficiently to make navigation safe.

Floating ice appeared in the river in the fall of 1897 on the 26th of September, which practically put a stop to navigation. Previous to this, however, in late August, owing to the early cold of that season, the small tributaries froze, producing a very low stage of water and practically stopping navigation some weeks before ice began to run in the river proper. Last fall (1898) ice began running in the river on the 11th of October. Both seasons the river closed entirely on October 26.

Generally speaking, therefore, the river may be said to be open and navigation practicable from the latter part of May to the end of September, or about four months. The ice in Bering Sea disappears later in the spring, and it is rarely possible for either ocean steamers or river boats to get into the harbor of St. Michael until the latter part of June. The three months of July, August, and September, with, in ordinary seasons, a part of October, cover the period of open navigation in the harbor of St. Michael. To get full advantage of the whole time that the river is open it is customary to have supplies placed inside the mouth of the river before the close of navigation in the fall. Boats are wintered in the lower river, loaded from these storehouses in the early spring, and one trip is made up and down before the harbor of St. Michael opens.

The high prices prevailing along the Yukon River are due to this short period of navigation, to the cost of fuel, and to the expense of wintering boats and maintaining crews of men upon them at a high rate of wages through long seasons of inactivity. Also the element of danger to boats upon the breaking of the ice in the spring can never be eliminated. Although up to the present time only one or two boats have been lost altogether, considerable damage is done every year by the action of the ice, and much expense incurred in the matter of repairs.

Another difficulty in this connection is the passage from the mouth of the river to the harbor of St. Michael, a distance of about 60 miles, 14 of which are around the outer edge of the island, exposed to the open Bering Sea, where storms are not infrequent.

I am reliably informed that the investigations of the delta of the Yukon, conducted by the Coast and Geodetic Survey during the past two summers, do not encourage the much-discussed

proposition of an entrance to the Yukon through the south mouth. Continued improvements in and about the harbor and on the island of St. Michael, involving large expenditures of money, will go far toward determining the question of its permanence as a distributing point for northwestern Alaska.

As a matter of historical rather than present interest, the situation in the harbor of St. Michael during the summer of 1898 will be briefly touched upon. It appears that a number of companies were organized during the winter and early spring of 1898 to do business in Alaskan waters, carrying passengers and freight, with no funds to back them except such as could be collected in payment of passenger fares and freight in advance. Another class of enterprises was the cooperative institution, which, by mutual agreement and contract, provided for the transportation of individuals to Alaska and, in many cases, their return for a certain sum per capita. In these latter cases, frequently individuals were permitted to contribute their quota in labor instead of money. These two classes of enterprises, the first with dishonest purpose to begin with, and both almost without exception laboring under incapable management and with insufficient means, after giving birth to the most original and unique inventions in the way of river craft perhaps ever assembled in one harbor, came ultimately to grief and abandonment in nearly every instance, the disappointed and unhappy promoters turning to the commanding officer for reparation and adjustment; not infrequently having expended already what little means had remained to them in legal bickerings before the commissioner's court. Needless to say their difficulties were in most instances beyond the power of any human agency to adjust satisfactorily.

A source of distress to legitimate business enterprises was the absence of currency in the harbor. The old-established companies had but a limited quantity, and such mistrust and suspicion existed, and with good reason, against every new venture, that it was almost impossible to negotiate any kind of security.

The past summer at St. Michael saw a sounder and better condition of affairs. This is shown by Capt. E. S. Walker's report.

The approach of winter along the Yukon is heralded by the falling and partial clearing of the water in the river, due to the freezing of the smaller tributaries and feeders in the hills. This is followed by the formation of ice in the sloughs and the slack-water places along the main river, and soon after by the appearance of floating ice in the channel. The period of floating ice varies from two to four weeks, final closing occurring, according to two years' observation and inquiry upon this subject, at very nearly the same time each year.

The surface of the ice after the river closes is very uneven, except through the sloughs, and the water continues to break through at different places almost the entire winter. As the cold increases the ice thickens and the shallow places freeze to the bottom, shutting off the water and forcing it back and through the ice and making travel more or less dangerous at all times.

The winter trade along the river is usually opened by some man of experience, and follows, as far as possible, the smooth ice near the shore. The trail having once been broken along the river, it is usually followed thereafter, although its original course might be improved upon and the distance shortened in many cases. Safety always lies in following the beaten trail, because the ice being covered with snow it is impossible to tell where one, striking for a new trail, may come to water underneath the snow. It is exceedingly dangerous in cold weather to get in water along the trail, unless one is provided with dry clothes with which to make immediate change. Experienced travelers on the Yukon do not hesitate, upon getting wet, to go into camp immediately, or make a change upon the spot. Most of the cases of frostbite that have come under my observation have been due to the carelessness in this regard by men inexperienced in winter travel in Alaska.

The general winter conditions on the Yukon are not nearly as severe as commonly supposed. The temperature sometimes falls as low as 60°, 62° being the lowest noted by me in two winters past. On one occasion, late in February and early in March of the present year, the minimum ten days' average was below 54 minus.

The cold is uniform, dry, and with very little wind. The statement may seem somewhat startling, but it is a fact that when the thermometer rises to zero, as it sometimes does in mid-

winter, it is too warm for comfortable travel. The best temperature is from 10° to 25 or 30° below zero. With this temperature the sleds run easily, dogs work with spirit, and one can exercise with the warm clothing necessary at all times in Alaska, without discomfort. Travel becomes uncomfortable when the thermometer reaches as low as 40 minus, and dangerous when it is below 50, even to the most hardened.

Furs are worn very little, except on the coast. The most satisfactory dress for all ordinary wear in the interior is a suit of mackinaw, or other heavy woolen cloth, warm underclothing, German socks over those usually worn, with moccasins or felt shoes, fur cap, and mittens. When traveling the coat is frequently taken off and thrown on the sled, and a cotton drill parkie worn during the day. (The parkie is a native garment, something like a shirt with a hood trimmed with fur.)

The houses or, more properly, cabins, constructed up to the present time on the Yukon, have been mostly log buildings, chinked with moss and covered with dirt. This kind of house is easily heated, and one more often finds the interior too warm and ill-ventilated than the reverse.

The principal trial of the Alaskan winter is its long-continued cold with the shortness of the days and the absence, at present, of anything like domestic or home life, or any of the ordinary amusements and means of diversion common to more inhabited districts. The scarcity of fresh vegetables and fruits is also a great drawback. The climate is to most people a healthy and invigorating one, and with improvements in the conditions and increased means of communication the spending of a winter on the Yukon will, I doubt not, in a few years, be looked upon with as much unconcern as one now thinks of wintering at St. Paul or Helena.

Conflicting statements have been made in regard to the summers on the Yukon. The statements were doubtless made in good faith, but as a matter of fact the summer in Alaska, like the winter in Texas, is the uncertain season. The summer of 1898 was warm, with little rain for many weeks. Experiments in gardening, where undertaken, were uniformly successful. The past summer of 1899 was quite the reverse. The ice went out late, the nights continued cold into July, much rain fell, and gardening did not meet with much success. At Eagle City, near the boundary, it snowed on the hills in the vicinity of the river on the 17th of August.

From my own observation, I should say that the Yukon River Valley promises nothing more in an agricultural way than the production of the hardiest vegetables and cereals, and an abundance of hay and grasses.

With the present high prices for food prevailing in that country, it will be found profitable for a certain number to engage in the business of gardening to supply the demand of the mining towns. Without the mines, however, there would be small inducement for one to seek a home amid the snows of Alaska for the purpose of cultivating the soil.

There is no doubt that most of our domestic animals can be used in Alaska, if properly cared for. The dog is the draft animal, as well as the companion of the Eskimo and Alaskan Indian, as is the reindeer of the Laplander, and our own people may, and do, employ these animals temporarily for similar uses, but I think the statement is a safe one that we do not wish to make a permanent home where the horse, mule, and ox can not live.

It is interesting to note how the center of the mining business has been first on one side and then on the other of the line separating this part of Alaska from the Northwest Territories of Canada. The first mines of importance, discovered in 1886, were located on the upper tributaries of the Forty Mile River, partly in Canadian and partly in American territory, with the business center of the district located at the mouth of the Forty Mile on the Canadian side. From here it was transferred to Circle City, Alaska, in the summer of 1894, mines of greater richness and promise having been discovered this same year on the headwaters of Birch Creek, about 60 miles from the Yukon.

Circle enjoyed great prosperity for two years, having in the winter of 1896–97, before the movement to the Klondike began, a population of about 1,500 persons, with many substantial buildings, From Circle, in 1897, interest and business rolled back again with a great wave to Canadian territory, centering at Dawson; and as the season of 1899 closes another transfer is well

under way to a newly discovered district on the American side, far to westward, on the shores of Bering Sea.

Unquestionably the most interesting feature of this latest discovery is the presence of gold in paying quantities in the so-called "ruby" sand along the ocean beach in the vicinity of Cape Nome.

On September 13, this beach was being worked for a distance of 25 miles, and men were taking out from $10 to $40 per day, per man, with an ordinary rocker. This vast extent of beach diggings, with limits not yet determined, supported by a creek district of undoubted richness only a few miles back from the shore, presents an attractive prospect to the seeker for placer gold. From $2,500,000 to $3,000,000 are claimed to have been taken out from the creeks and the beach during the past summer, and I think I am making a conservative estimate in placing the probable number of people in this district for the season of 1900 at 20,000. Minor movements during the past two years were to Rampart (Minook Creek), Eagle City (American Creek), up the Koyukuk and Tanana rivers, and to a host of smaller tributaries wherever colors could be found.

My experience and observation justify me in concurring fully with Major Ray in his recommendation of the establishment of a provisional form of government of a semi-military character for northwestern Alaska. As will be readily understood, the people of that region are drawn from every walk of life, and of every nationality, and are attracted, with few exceptions, to Alaska for the sole purpose of trying to improve their fortunes. They propose to do this either directly or indirectly through the gold discoveries of that country, with the design of returning to their homes in a more favorable climate as soon as possible.

Along with those who have the intention to work honestly toward the betterment of their condition is the usual following of lawless and worthless characters to be found in every mining district. The desire of this class of people is to live on the proceeds of the honest miner, and whose occupation is taking care of other people's business through the medium of the so-called miners' meetings, which, in the towns, are no more nor less than mob assemblages.

Very many people who originally went to Alaska with an eager ambition and strong determination to secure some of the riches promised to everyone by reports from that country, have, upon arriving and discovering the great hardships to be endured in the search for gold, and facing an entirely new and trying environment of climate and social life, become disheartened, unhappy, have spent their time in complaint against people who were more fortunate, and against the Government for not providing better for their comfort and protection. Not unfrequently before the end of a year they have become broken down in health and mentally deranged.

Although an elaborate criminal code has been passed, defining and providing punishment for crimes in Alaska, and providing a code of criminal procedure; also an act approved May 14, 1898, extending the homestead laws and providing right of way for railroads in the district of Alaska, and for other purposes; and several civil officials have been appointed to different positions in northwest Alaska, the situation in respect of the civil law and administration remains practically the same at the close of the summer of 1899 as it was two years ago, except in those districts where the presence of military officers and troops prevented the hitherto unlawful proceedings and decisions of the so-called miners' meetings. Section 152, chapter 8, Title I of the act approved March 3, 1899, is not thought to be capable of enforcement under the present conditions existing in Alaska.

The act approved March 3, 1899, prescribes a tax on various kinds of business conducted in Alaska, but so far as is known to myself none of the proceeds of this tax is made available for use in developing the territory. The result is that any sanitary measures, or the improvement of roads, sidewalks, etc., in mining towns, establishment of hospitals, care of the destitute and sick, are dependent entirely upon public subscription. This condition of affairs has made it absolutely necessary that the Government representatives should provide for the care of many sick and destitute people, or see them suffer and perhaps perish, unless taken care of through the charity of others—themselves, perhaps, but poorly supplied.

In the nature of things it is quite impossible for the government at Sitka to exercise any real control over northwestern Alaska at present, cut off as it is for many months from the outside world. The statement is a safe one, that without the presence of troops in northwestern Alaska riot and disorder would prevail in many places. Even where civil officials are located the will of the miners' meeting would determine, as it has in the past, whether their authority be respected. I deem it unnecessary to cite particular instances in proof of this general position. I desire merely to emphasize the fact that the ordinary machinery of government in our country does not seem applicable as yet to this remote region. It is cut off so much of the year with the outside world, and where no one has a fixed habitation, and the centers of population are so subject to change with each mining excitement, that it would not be safe to trust to it alone. On the other hand, if I mistake not, the troops at present have no legitimate power to act except in particular cases of riotous or unlawful gatherings endangering lives and property, and justified even then only by necessity in each particular case.

It is my belief that the conditions justify the establishment in northwestern Alaska of the form of government suggested before, and similar in general outline to that of the Northwest mounted police of Canada, and that it will meet with favor and approval of all of the better class of people in that country. The honest and law-abiding people in that section not only need protection to their lives and property for the time being, but they desire representatives of the Government whose official duties are merely incidental to the more important work they have in hand in money getting, and whose decisions on matters within their province will have the force and effect of law. The early history of mining camps in this country bear me out in this contention. Unless the conditions in Alaska are met and dealt with from the beginning, a repetition of those lawless and bloody days will be enacted in the far North, and the remoteness of that region will only give further immunity and protection to the criminal class.

Equal in importance to the above is the question of the natives in northwestern Alaska. The act approved March 3, 1899, forbids the sale to them of arms and ammunition with which to kill game, and also prohibits all persons, including natives, from taking any fur-bearing animals in the district of Alaska. These people, especially the Eskimo, are docile, industrious, and truthful, are very affectionate and faithful toward each other, and have demonstrated through many years their capacity to care for themselves and supply their simple wants in this difficult country without Government supervision or legislation. They are not warlike in any sense, nor quarrelsome, and have never been known to give trouble except when crazed by drink sold to them by unscrupulous whalers and traders.

The Alaskan native has the desire for strong drink characteristic of all the North American primitive races, and its sale should be denied him. Aside from this I see no reason why he should not enjoy every liberty extended to citizens from other parts of our country, and be accorded the privilege of full citizenship in his native land. He has shown himself throughout my observation of him in Alaska to be the equal in intelligence and superior in character to a considerable portion of the more favored citizens who have gone to his country in search of wealth. Formerly, along the river, many of them worked on boats during the summer, earning enough money thereby to purchase provisions during the winter. Now one rarely sees an Indian on a boat except in the pilot house.

Alaska cannot be called a good game country. Moose are scarce and very difficult to hunt successfully. Caribou are more plentiful, but seem to cover a large territory in their movements, and are not always to be found in the same districts during the same seasons in successive years. In the winter of 1897–98 one family of the Gens de Large Indians brought considerable caribou meat into Fort Yukon for sale. Last winter these same Indians were unable to get sufficient to keep them from starving to death.

The officers under my command deserve more than a passing notice. Captain Walker, stationed at St. Michael in 1898, was especially fitted for the work to be done there, involving, as it did, many delicate questions of personal and property rights. The best evidence of his capacity was his grasp of conditions during the period named. Too much praise cannot be given to Lieutenant Bell for the patience and good judgment shown by him in preserving the peace in

the Rampart district, and in settling amicably the many disputes submitted to him. Lieutenant McManus, on November 16, 1898, with the thermometer 52 degrees below zero, volunteered to make a journey 12 miles down the river from Circle to assist in rescuing a man reported to be helpless and freezing. This he successfully accomplished, making the distance of 12 miles and return between the hours of 1 and 8.30 p. m. Subsequently this same officer made a journey to Rampart City and return in the months of December and January, a distance of 700 miles. Actg. Asst. Surgs. H. J. Schlageter and Harry Partridge, on duty with me at Circle City, attended to their duties in a highly satisfactory manner.

A RECONNOISSANCE BETWEEN CIRCLE CITY AND THE TANANA.

By Second Lieut. GEORGE McMANUS, Third Artillery, U. S. A.

I left Circle City April 3 on my mission to explore the region between the last-named town and the Tanana River. I was accompanied by H. E. Redmyer, in charge of the Government herd of reindeer, and a Tanana Indian as guide. Nine reindeer were furnished for the transportation of the party. The weight of provisions and camp outfit was estimated at 550 pounds. The trip to Miller Creek was made quickly and without incident. From this point on, however, we encountered considerable water and glare ice. The water was due largely to the lateness of the season, and it increased as we advanced. When about 20 miles below the headwaters of the Trutlaneekla it was discovered by Mr. Redmyer that the reindeer could go no farther on the ice, as they were unshod and unable to make headway.

Mr. Redmyer and myself continued on our journey about 25 miles with a hand sled to an Indian camp. There I tried to get a dog team, but failed. As farther progress seemed impracticable with hand sleds without danger of being caught by the advancing spring and thereby being forced to go down the Tanana River by open water, I deemed it advisable to return, which I did April 13. I estimated the point I reached to be about 145 miles from Circle City by the trail we had come, and 55 miles by trail to the Tanana River.

On returning to the point where we had left the reindeer, the Laplander in charge reported that the animals had gotten away from him and stampeded with a herd of caribou. I then returned alone to the mouth of Twelve Mile and from there made a reconnoissance of an Indian trail leading to Birch Creek. From thence I proceeded up Harrington Fork and over the divide to the Chaytaltic. This completed, I returned to the mouth of Twelve Mile, and while in camp there was joined by Mr. Redmyer. He had returned from the Trutlaneeka without finding the reindeer. This occurred on April 21. The distance traveled was estimated to be about 350 miles, of which 125 miles was with reindeer and the remainder on foot, mostly with hand sled.

Although unsuccessful in reaching the Tanana, I believe the information gained of the head waters of the Trutlaneeka and Chaytaltic rivers is of great value in consideration of a trail from Circle City to the Tanana. While the lateness of the season caused embarrassment in one way it was at the same time an advantage, in that the Indians from the Trutlaneeka and Chaytaltic had just been to Circle City to trade and their trails were easily followed. The Indians native to these localities are without doubt better acquainted with the country than anyone else. I believe that their trails leading to the middle Tanana are as good as can be found.

After I returned from my trip a band of Indians from the Suchakut visited Circle City to trade. From an Indian called "Birch Creek Joe," and from a party of prospectors who visited the head waters of the Suchakut with Joe a year ago last winter, I obtained information which has enabled me to sketch a fairly accurate map of the South Fork of Birch Creek and the trail leading by it to the Suchakut and Tanana rivers. This trail has the advantage over those leading to the North Fork of Birch Creek of having but one mountain divide to cross, and that said to be very low and easy. It also leads to a point on the Tanana more nearly on a straight line to the south coast of Alaska.

On the other hand, the trails leading from the North Fork of Birch Creek strike the Tanana

near a point designated on some maps as Fort Healy. This is only an Indian village at the present time, but there is the possibility of a trading station being established there in the near future. In going from Circle City by these trails one travels through a mining district for about 70 miles, occasionally meeting inhabitants.

As to which of the three trails to the Tanana is the most feasible, I can not make a positive assertion with the information now at hand. I should say that each is feasible, and that the one preferred depends entirely on what point of the Tanana it is desired to reach. As the location of a trail from this point to the Tanana is closely associated with the establishing of a route to the south coast of Alaska, I deem it proper to state here that I believe it desirable that such a route should strike the Tanana at some place near its middle point, say the mouth of the Delta or of the Nenano River. Rampart City and the lower river could then be reached from the south direct with a great saving of time and distance traveled.

The branch of the trail leading to Circle City would then be used only for the lower Yukon country. Such a route, while greatly to the advantage of the middle and lower Yukon district, would still serve Circle City and the upper Yukon as well or better than any other. It should be noted that Rampart City is almost as near to the coast as it is to Circle City. The absence of any trading or supply station on the Tanana River at the present time is the greatest drawback to travel in that locality. The best and only economical way to take supplies in bulk to the upper Tanana is by steamboat in the early summer. Until supply stations or a trading post is established by this method, thus relieving the long stretch of destitute country, I believe that no general satisfaction can result from the opening of any route to the Tanana River and south coast.

WHAT I SAW, HEARD, AND DID IN AND ABOUT RAMPART CITY, ALASKA.

By First Lieut. EDWIN BELL, Eighth Infantry, U. S. A.

When I arrived at Rampart City, Alaska, September 21, 1899, I began at once to improve and enlarge the post by contract and by the labor of my command. The government of the town was in the hands of a board, consisting of five trustees elected by the people. The board waited on me and desired to know what stand I was going to take in regard to the government of the town. I replied that I should not interfere in any way as long as they had a government of their own. I would support them in case of any trouble.

One feature of their government was the right of appeal to the people at large whenever the decision of the board was not satisfactory. As there was considerable opposition, this appeal was made in almost every case of importance, and the decisions which had been rendered reversed. Tired of fighting against this opposition, the board at last resigned, and the control of all affairs fell into my hands.

On December 1, 1898, I sent two enlisted men, with dog transportation, from Rampart to Nulato to connect with a detail sent from Fort St. Michael to carry the official mail. On January 3, 1899, the men returned, making the round trip of about 700 miles in thirty-four days. The mail was then turned over to Lieutenant McManus, who carried it to Circle City on his return.

About the middle of February I received repeated complaints against two men who were at the mouth of the Tanana River and were reported to be selling liquor to the natives. A detachment was sent to bring them in, but before the troops arrived the offenders fled. In the middle of March the captains of five river steamers, who were wintering at Dall River, reported a lawless condition of affairs at that point and asked for protection. I arrested the five men who were instrumental in causing the disturbances and had them confined in the guardhouse at Rampart City.

About May 1 a man was lost on the Tanana River, and when found was so badly frozen that medical attendance was found necessary. The physician was dispatched to the spot, together

with a detachment. All possible was done for the unfortunate man, but he died and was buried at Weare. During the year the camp has been most orderly and law abiding. In cases involving property I simply acted as arbitrator and had the parties agree to a settlement before me. When I arrived at Rampart a hospital was in existence, supported by the city. Through bad management it ran in debt and had to close. I hired a building and started a hospital for the destitute. Much suffering was relieved. The health of the people has been very good throughout the year. Out of a population of 1,500 there were only 14 deaths.

There is no doubt but gold can be found at Rampart in considerable quantities, but it requires capital to get it out. It will be several years before capitalists can be induced to invest here. The Cape Nome excitement took a great many people from Rampart. Rampart has 450 cabins, 10 stores, 12 saloons, 1 brewery, and 6 restaurants. Considerable business was transacted in the winter of 1898 and many improvements were made. The most important of these was the making of a trail from Rampart City up Big Manook over the Tanana divide to Baker Creek. The trail is 4 feet wide and runs almost in a straight line to within 30 miles of the Tanana River. With very little trouble this trail could be extended to the Tanana River and used for a mail route during the winter to connect with the route from Cooks Inlet to Circle City. There are at present six different creeks around Rampart on which gold has been found in paying quantities. The location of the city is a splendid one, being situated on a plateau above high-water mark with a gentle slope toward the river, which renders the sanitary condition better than in most camps on the Yukon.

ALASKA.—1899.

COPPER RIVER EXPLORING EXPEDITION.

Capt. W. R. ABERCROMBIE, Second United States Infantry, Commanding.

COPPER RIVER EXPLORING EXPEDITION.

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The object of my expedition was to open up a military road from Valdez to Copper Center, and from the last-named point by the most direct and practicable route to Eagle City. My instructions were to carefully survey the route to Eagle City, triangulate it, note elevations, depressions, and other features, definitely locate the route and properly mark it on either side as far as practicable, in order that it might be known and used as a route of travel for the public.

I was also instructed to select suitable locations at Valdez, Copper Center, the crossing of the Upper Copper, the crossing of the Tanana, the head of Forty Mile Creek, and at such other points as in my judgment I might deem proper for military reservations. I was also instructed to survey, lay out by metes and bounds, and declare such reservations, reporting my action in the matters stated to the Department for the approval of the Secretary of War. The expedition under my command was further instructed to cover as much territory as possible. It was to collect and incorporate in reports all information that might be valuable to the country explored regarding topographical features. The available routes of travel, feasible routes for railroad construction, adaptability for agriculture and stock raising, mineral resources, timber, fuel, food products, and stock best suited for food and transportation purposes were also to be treated, and the number, location, and condition of the natives of the territory explored.

I was to make a careful examination of the fish industry in that country, and report everything bearing upon that subject that would be of public value.

At Copper Center I was instructed to make a full and complete examination of the Copper River, with a view to locating the most practicable crossing. A similar examination was to be made for the purpose of locating the best crossing of the upper waters of the Copper River, and also the most desirable passage of the Tanana. I was to state definitely location of crossings, depth of water, widths of stream, and whether conditions would permit fording or require the operation of ferriage. The passes over the glaciers and through the mountains finally selected as the most practicable entrance to the interior were also to be carefully surveyed, triangulated, and platted with full and complete figures of distance, altitudes, and width of passes; and they were to be definitely located and properly marked in order that they might be declared a military road by the Secretary of War.

Leaving Washington, D. C., on the afternoon of March 22, 1899, I made my first stop at Fort Keogh, Mont., for the purpose of purchasing pack horses. I was disappointed in finding what I desired, and decided to go to Livingstone, Mont., and make my selections. While there I met Mr. Edwin Gillette, of Sheridan, Wyo., the engineer of the expedition, who gave me some valuable information as to where I could get men fit to build trails. From Livingstone I proceeded to Seattle, Wash., where I began the organization of my expedition. By April 10 the men engaged to do the packing for the expedition arrived at Seattle. On April 15 we embarked on the steamship *Excelsior* with men and horses and beef cattle for Port Valdez, Alaska.

After an uneventful voyage of six days (5), anchor was dropped at Port Valdez, we arriving there on April 21, 1899, about 6 o'clock p. m. The scene that followed the arrival of our vessel at Valdez was one that I shall not soon forget. Crowding aboard the steamer came the Argonauts

of last season's rush into the Copper River Valley, and who now considered themselves full-fledged miners, although many of them had never handled either a pick or shovel since their entry into the country. A more motley looking crowd it would be hard to imagine. They wore mackinaw suits of all varieties and colors, and their clothing was faded and worn by exposure to the elements and their long journey over the Valdez Glacier (6) from the Copper River Valley. They seemed to be badly demoralized; and from a hurried conversation I had with six or seven I had known the year before, I was led to believe that hundreds were dying of starvation and scurvy beyond the Coast Range in the Copper River Valley. Most of those then in the settlement of Valdez had little or no money; but notwithstanding this fact, a wholesale orgy was inaugurated that lasted until midnight.

In some way these people became possessed of the idea that the Government contemplated furnishing them transportation from Valdez to Seattle, and it was not for some days that I could disabuse their minds of this fact. That they had passed a terrible winter was beyond all question of doubt; that many of their companions had died from scurvy and had been frozen to death was in evidence at the little graveyard that had sprung up since my departure the year before.

One of the first men from whom I could get an intelligent account of the condition of things was Quartermaster's Agent Charles Brown (7), whose salutation to me was, "My God, Captain, it has been clear Hell! I tell you, the early days of Montana were not a marker to what I have gone through this winter! It was awful!"

Going ashore with Mr. Brown, I visited the various cabins in which he had housed some 80 or 100 of these destitute prospectors, and from what I saw there I was satisfied that, while his remarks might have been forcible, they were not an exaggeration.

Many of the people I had met and known the year before were so changed in their appearance, with their long hair hanging down their shoulders and beards covering their entire face, that I do not think I recognized one of them. They were crowded together, from 15 to 20 in log cabins 12 by 15, and in the center of which was a stove. On the floor of the cabin at night they would spread their blankets and lie down, packed like sardines in a box. Facilities for bathing there were none. Most of them were more or less afflicted with scurvy, while not a few of them had frost-bitten hands, faces, and feet. Their footwear in some cases consisted of the tops of rubber boots that had been cut off by Brown and manufactured into shoes. Around their feet they had wound strips of gunny sacks, which were used in place of socks. Across the cabin, from side to side, were suspended ropes on which were hung various articles of apparel that had become wet in wallowing through the deep snow and had been hung up at night to dry. The odor emanating from these articles of clothing, the sore feet of those who were frozen and the saliva and breath of those afflicted with scurvy, gave forth a stench that was simply poisonous, as well as sickening, to a man in good health, and sure death to one in ill health.

I at once directed Brown to hire a cabin in which to organize a hospital (9 and 11), and another one for a cook house (10 and 12), and to employ a crew to run both places.

I noticed in talking to these people that over 70 per cent of them were more or less mentally deranged. My attention was first directed to this fact by their reference to a "glacial demon." One big, raw-boned Swede, in particular, described to me how this demon had strangled his son on the glacier, his story being that he had just started from Twelve Mile Plant (a small collection of huts just across the Coast Range of mountains from Valdez) with his son to go to the coast in company with some other prospectors. When half way up the summit of the glacier, his son, who was ahead of him hauling a sled, while he was behind pushing, called to him, saying that the demon had attacked him and had his arms around his neck. The father ran to the son's assistance, but, as he described it, his son being very strong, soon drove the demon away, and they passed on their way up toward the summit of Valdez Glazier. The weather was very cold and the wind blowing very hard, so that it made traveling very difficult in passing over the ice between the huge crevasses through which it was necessary to pick their way to gain the summit. While in the thickest of these crevasses the demon again appeared. He was said to be a small, heavy-built man and very active. He again sprung on the son's shoulders, this time with such a grasp that, although the father did all he could to release him, the demon finally strangled the

son to death. The old man then put the son on the sled and brought him down to the Twelve Mile Camp, where the other prospectors helped him to bury him.

During the recital of this tale the old man's eyes would blaze and he would go through all the actions to illustrate just how he fought off this imaginary demon. When I heard this story there were some ten or twelve other men in the cabin, and at that time it would not have been safe to dispute the theory of the existence of this demon on the Valdez Glacier, as every man in there firmly believed it to be a reality.

I was informed by Mr. Brown that this was a common form of mental derangement incident to those whom a fear of scurvy had driven out over the glacier, where so many had perished by freezing to death.

The disembarkation of the expedition at Port Valdez took place on April 22. The pack horses and beef cattle were unloaded first. There being no lighter available, two of the ship's boats were lashed to a fore and aft deck beam, forming a craft resembling a catamaran. On the deck beams referred to was placed a decking of loose lumber, leaving room for two men to operate the oars in the bow. A large box, the size of an ordinary horse stall, was swung in the rigging of the ship and lowered into the hold by means of a steam wench. This box was provided with a door at each end, and that, when opened, had the appearance of a gangway. The animals were led in, both doors closed and fastened, the box hoisted over the ship's side and then lowered onto the deck of the catamaran, which was rowed ashore, the front door opened, and the animals led out onto the beach. The transition from the dark hold of the ship into the glare of the snow so confused and bewildered the animals that on landing them on the beach some of these cattle ran back into the bay and were swimming around in the water for over half an hour before they could be driven back to the shore again. All of the animals shipped from Seattle were landed at Port Valdez without injury.

In pursuance of my instructions to construct a trans-Alaskan military road from the cantonment at Port Valdez to Port Egbert, Yukon River, I selected for the personnel of this duty men who had been formerly employed in railroad and trail construction through the Big Horn and Rocky mountains in Colorado and Wyoming. As a result, there was brought together a number of men of large experience in such work. I was authorized to employ a surveyor and an assistant surveyor, 2 topographers, a foreman of trail crew, 4 rock workers, 2 cooks, and 15 axmen. This authority was afterwards increased by the Acting Secretary of War so as to provide for all the unemployed in the Copper River district.

On April 25 I sent my assistant surveyor and foreman on snowshoes (25) up to the mouth of the Keystone Canyon, to select a construction camp and a site for a substation. Their instructions were to carefully note the depth of snow en route, with a view to the use of pack animals. April 27 these men returned and reported, that while the snow was quite deep in some places, yet by following the open stream bed of the lower river (which at this season will not average over 10 inches in depth and about 10 yards in width), an outfit could be packed up to the mouth of the canyon.

The work of construction on this military road is reported in full by First Lieut. Walter C. Babcock, Eighth United States Cavalry, topographical officer of the expedition. April 29 the trail crew (26) left the cantonment at Valdez and proceeded to the mouth of the Keystone Canyon (27). The reason for commencing work at the mouth of the Keystone Canyon, instead of starting from Valdez, was that the first 15 miles of the trail passed over, the flood plain of the Lowe River Valley (28 and 45), which, at this season of the year, was covered by some 3 or 4 feet of drifted snow, made it impossible to tell just where the glacial streams would cut during the high-water period of July and August. By beginning work at the mouth of the Canyon, the construction party could work up into and over the foothills of the canyon and down the Lowe River Valley over ground that was known to be above the high-water mark. This initial point is designated on the accompanying map as station 22 and 30, No. 2, and is 14 miles up tidewater and 270 feet above sea level.

While the trail crew were engaged in building log cabins for station 2, the surveyors were pushing forward with preliminary lines of location along the left or west side of the canyon,

which was found to be about 3½ miles in length. This work was very slow and laborious, owing to the deep, soft snow, which was now melting quite rapidly. By reference to the accompanying map it will be found that the formation of this canyon is eruptive in character, being much broken, as shown by the irregularities of the contours. Starting in on a hillside cut, one-half mile below station 2, the trail follows the side of the foothills in the northeasterly direction, through a heavy growth of spruce timber and underbrush, until it crosses a small stream at an elevation of some 600 feet, where it bears off sharp to the north and climbs the face of a bench or fork in the formation with more or less retaining wall, where it again takes an easterly trend, describing a half circle back to the north again, crossing a creek and bridge, No. 1, again bearing off to the west along the canyon walls, where the road is cut through almost solid rock, keeping at an elevation of about 700 feet and following the meanderings of the canyon to its head.

The scenery of this portion of the trail is unique in character (32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 47) and most impressive, comparing in grandeur and massive outlook with either the Grand Canyon of the Colorado or that of the Yellowstone. To the right are three beautiful waterfalls (35), with small glaciers far above them on the mountain summit, one of these falls (38) having a plunge to the river below of 700 feet. Looking down toward the mouth of the canyon may be seen a monster glacier on the south side of the Lowe River Valley, with its deep-blue coloring, framed in by the green foliage clinging to the canyon walls (44). Looking up the canyon on the right side is a perpendicular wall of rock over 1,200 feet in altitude. The entire terraine is covered by a dense growth of underbrush, principally the alder, a bush growing from 8 to 12 feet high, with limbs and trunk so interwoven as to render crawling through it without cutting one's way an impossibility. Leaving the head of this canyon the trail keeping an even grade over the side-hill (41) cut along the base of the mountains, almost uniformly on the 800-foot level, passes over a slope, which, like that in the canyon, is covered with a dense growth of alder, wild flowers, and grass, which, from year to year, has formed a vegetable mold, covering the gravel and bed rock from 2 to 2½ feet thick, which holds the water like a sponge and is soon cut up into a fine brown muck.

It rains constantly in this section of the mountains, and as there is a continuous seeping down the trail, making ballasting a necessity to keep the roadbeds in passable condition, while in crossing the small streams, which are numerous, a short piece of retaining wall is necessary to hold the trail in place. Leaving this hillside cut the trail crosses the first stream of any size (46), which is a drainage of the east end of the Corbin Glacier (55). The site selected by the construction of bridge No. 2 was on a reverse curve of the stream, where one abutment could be placed on a solid rock foundation, while the other rested on a crib built in an eddy (46). Crossing over this bridge the trail passes through what is known as Dutch Flat (48, 49, 50, and 51), over an old morain, through a heavy growth of cottonwood timber and a second glacial stream, which is spanned by a two-abutment bridge (52), one crib of which is built around a large bowlder and the other in an eddy. From this point the trail begins to climb up out of the Lowe River Valley by a side cut, through gravel and a green chist rock, very hard in character, over a succession of benches or immense rock ledges by an imperceptible grade to the summit of Thompson Pass (48), which is simply a sag in the backbone of the main range.

It then drops down into Ptarmigan Creek, which flows into the Chena River, some 6 miles below, over a still easier grading than that encountered in climbing up the south side of the range. The topography here is very rocky and broken. Following down Ptarmigan Creek for some 3 miles, the trail comes out into quite a wide valley space (53 and 54), which is composed of washed gravels formed into numerous sand bars. Following down the eastern side of the Chena Valley, sometimes called the South Fork of the Tiekell, the first 6 miles of the trail are over old morainic matter, covered with a rank growth of grass and red willows, after passing which the mountain sides become more abrupt and the valley space narrows in. The trail from here on to the first crossing of the Chena at the second canyon is like in character that from the head in Keystone Pass to the crossing of the Corbin Glacial stream, a side-hill cut with an occasional retaining wall. Ten miles down the Chena Valley from Thompson Pass is the first spruce timber met with on the Copper River side of the range. Here station 3 (56) is located, which consists of a

log storehouse with a shingle roof, for the preservation of supplies, and a smaller cabin, with a shingle roof, for the station keeper. The river on entering the first canyon, which is a few miles below station 3, makes an abrupt turn to the west, which course it holds for half a mile or more, when it again turns to the north, rushing down the valley through a succession of small rocky canyons, across one of which, 3 miles below station 3, the trail crosses at a narrow gorge by a bridge 120 feet long and about 30 feet above low-water mark (57, 58, 59, 60, 61, 62).

This bridge consists of one crib built on a portion of bed rock, submerged at high water, its corresponding abutments being rocky reefs on the opposite shore. To hold a crib under a bridge in this country it is absolutely necessary to secure a rocky foundation, for, in addition to the great velocity with which these mountain torrents flow, there is carried an immense amount of detrius, carried downstream from the irroding glacier walls many thousand feet above on the mountain summit, which increases the specific gravity of the water above 50 per cent. And if the crib is not built on an absolutely solid foundation a vibratory motion is soon set up, which carries away the structure, and a washout will be the result. Following down the west bank of the Chena, after crossing this bridge, for a distance of some 7 miles over a large broken country the last canyon is passed and the river bottom again opens out into a gravel-bar formation, which continues to the junction of the Chena and Kanata rivers, called the North Fork, which form the Tiekell, which river flows into the Copper through a series of canyons some 15 miles in length, about 50 miles below Woods Canyon. About 10 miles below station 3, in a cottonwood grove, will be found a log relief cabin (63), placed in this particular location as a harbor of safety for the traveler, for the reason that in this canyon section, between this cabin and station 3, the storms in winter, which last from three to five days, appear to concentrate their fury. Some 10 miles below this cabin the trail crosses a small peninsula, locally known as the Stewart Creek Divide (64), and, keeping close to the base of the mountain, crosses Stewart Creek (65), which is bridged at a gorge 1 mile above its mouth. After crossing Stewart Creek the trail enters the heavily timbered cotton growth, through which it passes over a gravelly flat for a distance of 3 miles, where it merges on the banks of the Kanata (66).

The mountain formation of the Kanata Valley, up which the trail passes, is less precipitous in character than that of the Chena, with practically a nominal grade of some 800 feet in about 19 miles, to a low bog divide, where it has its source, together with that of the south branch of the Tonsena. To avoid this stretch of bog country, the trail bears to the east, crossing a much higher divide, but over solid ground, descends into the Tonsena Valley, where it crosses one of the branches of that stream, and, following a small stream coming in from the north, continues on over a low, level, thickly timbered country, striking the Klutena River 9 miles above its mouth. Construction work on this road was completed to the southern slope of the Klutena Divide, where a log stable (67) and a small cabin were built for the accommodation of public animals, ten of which were left there for the winter, so as to be available for early work in the interior during that period when the snow on the coast is too deep to move stock in.

For the use of those prospecting the Chettyna and Kotsena districts, the trail should be located down the Tonsena Valley to a crossing of the Copper; while for those traveling into the Chestochena and Forty Mile districts it should continue northeast, crossing the Klutena and Tazlena, and, striking the head of the Chestochena, the base of the main range should be followed to a large lake, which has an outlet in the Slahna Valley, crossing which the Tok may be followed to the Tanana. For the Upper Tanana and White River districts a crossing should be made at Copper Center, thence in an easterly direction across the big bend of the Copper, over the Mount Sanford Plateau to the south of Cornwall Ridge, again crossing the Copper near its head waters, to the Tanana and White River country. (See general sketch of the Upper Tanana and watershed.)

As that portion of the trans-Alaskan military road already constructed is the only means of entering central Alaska from the Pacific Ocean, it is of the utmost importance to the traveling public that the mountain division, from station 2 to the Tonsena watershed, should be kept in repair. In its green condition, one season's neglect would, in my opinion, put it in an impassable condition and render the results of last season's labor a total loss to the public. Washouts and

landslides along the side-hill cuts of the mountains, and the unequal settling of the cribs in bridge construction, render it imperative for the first year, at least, following construction, that this trail should be kept in repair to be of any permanent value.

To eliminate as far as possible the loss of life from freezing, incident to traveling over the divide in winter from station 2 to station 3, I began the construction of a telephone line, which was carried up to within three miles of the summit, when, owing to the lack of transportation, I was forced to abandon its completion. To connect with this line, I started a second from my cantonment at Port Valdez, which I carried to within a mile and a half of station 2. It was my intention to paint the poles on the summit with alternate rings of black and white, similar to the guideposts used on the Russian postal roads through Siberia, but, my transportation failing, I was unable to connect these lines.

During the latter part of June and the fore part of July, the enormous flow of water (68, 69, 70, 71, 72) from the Valdez Glacier (73, 74) bade fair to wash away not only the town of Valdez (75, 76, 77, 78, 79, 80), but our cantonment. The volume was so great as to entirely cut off all communication with the interior, except from a narrow strip of land at the mouth of Lowe River, at which point I constructed a log storehouse and cabin, designated as station 1, and practically the southern terminal of the military road. From observations made during high water, I found that during the latter part of July and the first part of August the gravel bars in Lowe River were covered to such a depth (45) that it was necessary to build the trail along a side hill. Having completed this work, I, on July 27, relieved Lieutenant Babcock in charge of the construction camp and sent him forward with a locating party to carry the line, if possible, to the crossing of the Klutena River. Owing to the dense growth of underbrush, which had to be cut before horses could be taken through, it was found that the cutting of the preliminary line involved about as much labor as the clearing of a right of way for a railroad in an ordinary country. The farthest point north, therefore, reached by this party was the Tonsena Valley.

EXPLORATIONS IN THE COPPER RIVER DRAINAGE.

On June 15, the topographers having triangulated and taken the soundings of Port Valdez, carried the topographical work up to the mouth of the Keystone Canyon, to connect with that of Lieut. Walter C. Babcock. I directed the topographer, Oscar Rohn, to proceed with an outfit of pack horses and dogs (83, 84, 147) into the interior by Thompson Pass, thence down the Tonsena River to a crossing on the Copper, and from that point to explore the country in the Chettyna River drainage and, if possible, cross over from this valley to the head waters of the Copper River, thence down the Copper River to the mouth of the Klutena, in time to return to the coast not later than October 25. In addition to sketching the topography of the country traveled over, Mr. Rohn was directed to gather all useful information bearing on the geological, agricultural, and forestry resources, and to determine, if possible, the alleged existence of geysers among the foothills of Mount Wrangell.

July 27, I sent Mr. A. M. Powell, one of my guides, who accompanied me during the previous expedition, into the Klutena country. His point of departure was to be the Devils Elbow, on the Klutena River. His general course was to be east by north to the foothills of the main Alaskan range, and from thence in an easterly direction along the foothills of that range to the head waters of the Slahna River in the vicinity of the Mentasta Pass, and while carrying out these instructions he was to note the location of the available hay meadows and sites for substations, and the depth of streams, with a view to the location of sites for the construction of bridges.

FEASIBILITY OF RAILROAD CONSTRUCTION.

The harbor at Port Valdez (85) is what is technically known as a submerged valley, the head of which is filled in with glacial deposits and terminal moraine. The harbor from Stanton Narrows to the mouth of Lowe River (86) is some 10 miles long by 3 miles wide. The environment is a series of lofty sawtooth mountains (87, 88), plunging abruptly into the bay. Owing to the great depth of water and the proximity of the warm Japan current, this harbor—with the excep-

tion of a mile and a half at its head, where the fresh water flows on the surface of the salt forms a scum of ice from 1 to 6 inches thick at spasmodic intervals during the month of January—is accessible at all seasons of the year for ships of any size. The most desirable anchorage, owing to the great depth of water, which ranges from 80 to 112 fathoms, is a flat about 1 mile square, below the mouth of Lowe River, where a 30-fathom anchorage can be found at low water to 1,000 yards from shore, where the water drops off to the depth of 70 or 80 fathoms.

Owing to the immense flow of water from the Valdez Glacier, which is so erratic in its course as to wash the entire plain between the foot of this glacier and tide water (85), the only feasible point of departure which would embrace all the natural facilities for railroad terminals would be a narrow neck of land from one-half to three-quarters of a mile broad and extending up the Lowe River Valley some 5 miles, and south of a small stream which is an outlet of Robe Lake. Following up the Lowe River Valley the line would naturally keep to the north side over a practically nominal grade. Passing through the Keystone Canyon with ordinary canyon work and emerging on the flood plain of the inter-canyon basin, the operator would from this point have the choice of two routes—one following an easterly direction over Marshall Pass at an elevation of 1,700 feet, and down the Tasnuna to the Copper River Valley. The other would turn to the north, crossing the mountain range at Thompson Pass with an altitude of 2,600 feet, thence down the Tiekell River Valley through the swampy pass at the head of the Kanata, thence down the Tonsena into the Copper River Valley.

The future for a railroad through this section of Alaska is, in my opinion, very promising, owing to the presence of large zones of heavily mineralized copper deposits, the development of which will unquestionably yield a local tonnage of great volume. The proximity of tie and bridge timber and the absence of any great engineering features would render railroad construction in this section a comparatively easy problem for a mountain division.

GEOLOGICAL AND AGRICULTURAL POSSIBILITIES OF THE COPPER RIVER DISTRICT.

During the summer of 1899 the prospecting of some fifteen or twenty men over an area much larger in extent than that covered by all the New England States resulted in a practical demonstration of the existence of heavily mineralized zones of copper, borite, and other ores in the mountainous districts of the Chettyna, Mount Blackburn, Tanana, and White rivers, which, collectively, may be classified as the Wrangell, series, and in the main range of the Rocky Mountains at the head of the Chestochena River. From this area I succeeded in obtaining 35 hand samples of average ore, which, upon assay, showed the presence of from 16 to 81 per cent copper, with traces of gold and silver. There can be very little doubt that in favorable localities of the Wrangell group of mountains (which are volcanic in origin), concentrated copper deposits will be found in great masses. It is not uncommon to find nuggets of native copper in the shape of float, varying in size from small bird shot to pieces weighing many pounds. While this metal seems to predominate in an oxidized form, cinnabar, galena, gold, silver, and iron ores have been found in many places; while placer deposits carrying gold as coarse as corn kernels have been discovered on Quartz Creek, Fall Creek, and on the head waters of the Chestochena. On the latter stream the pay gravel is said to run from $1 to $25 per cubic yard. Coal deposits of the Kenai series were found on the Tazlena, Gakona, and Chestochena, which are said to be of a very high order of lignite and of economic value. Marble of various colors is found in quite extended dikes.

Attention is invited to the subreports of Mr. Oscar Rohn, H. M. Powell, and H. B. Pearson, covering the districts above referred to.

In addition to the information relative to the agricultural possibilities of this section of the country, reported on by me last season, I desire to call particular attention to the fact that potatoes, beets, turnips, radishes, peas, and lettuce for the sustenance of man may be grown in almost unlimited quantities; while oats, rye, and wheat were matured during the past season (89).

With a view to giving employment to the stranded prospectors, I was authorized to accept

proposals for hay contracts at Port Valdez and in the Copper River Valley, which resulted in the putting up of some 70 or 80 tons of hay of as fine a quality as that usually delivered under like contracts at military posts in Montana and Wyoming.

I wish to emphatically call attention to the fact that owing to the absence of that season known as the fall of the year, the transition from summer to winter being so rapid—usually a matter of a few days—that the grass is blighted by the frost while green and becomes valueless as an article of forage.

Should the mineral resources of this country develop to such an extent as to support a large mining population that would consume a local product, the future for the small farmer in this section of Alaska will undoubtedly be attractive to many.

A most promising and lucrative feature for the speculator will be the driving of cattle from Port Valdez into the Yukon mining districts. Thousands of head of horses and cattle can be subsisted upon the grasses of this section by crossing the latter in the summer, and on the grain and hay that can be grown by the small farmer. The latter can be sold at a handsome profit during the winter.

The high freight rates of marine transportation from Seattle to the Yukon River points and those of dog and man transportation from the latter points to the head waters of the various creeks, on which are located the mining camps of the Forty Mile district, bring the cost of transportation of food into that country up to the estimated figure of 45 cents per pound and renders the $10 a day diggings valueless under the existing conditions. As the cost of steamer transportation between Seattle and Haines Mission (the southern terminal of the Dalton trail, over which cattle are now driven to Rink Rapids, on the Yukon, where they are slaughtered and the carcasses shipped down the river to Dawson, Eagle, and other points) and that to Valdez (the terminal of the trans-Alaskan military road) would be about the same, the saving in mileage from Valdez to the Forty Mile country would be some 200 miles. From Valdez cattle can be delivered on the hoof to any of the camps now in operation in the Forty Mile district, thus saving the cost of their transportation from the coast. To make this drive the stock should be landed at Valdez not later than June 1 and graze through the Forty Mile country, where they should arrive not later than August 20. From this point small bands could be driven to the various camps and slaughtered late in September, when the climatic condition would keep the carcasses in a perfect state of preservation for consumption as desired. If, on the other hand, it was desirable to winter the animals at these points for delivery in the early spring, thousands of tons of hay can be put up in the Tanana Drainage for winter feed to carry over the stock.

TRANSPORTATION BEST ADAPTED FOR SERVICE IN THE COPPER RIVER DISTRICT.

The greater portion of the transportation taken north for the Alaskan Exploring Expedition No. 3 being starved or frozen to death during the winter of 1898–99 (see report of Edward Cashman, quartermaster's employee, appended), near Terrell, on the Copper River, it was decided to ship north for service a thoroughly broken pack horse, ranging in about the same climatic conditions in the States as would be found in that portion of Alaska in which the expedition was to operate. With that end in view a train of thirty animals was selected by a board of officers at Fort Yellowstone, thoroughly well-broken and wonderfully effective in service (90, 91). These animals were a marvel of endurance. On April 29 they packed their first load out of Valdez, in snow from 3 to 5 feet deep, in which they were perfectly at home. As the snow melted and the water in the river rose they behaved equally well in fording the swiftest streams. Later on, when the rainy season set in, they kept in good flesh and did excellent work. Early in the season I saw from the consumption of food at the construction camp that it would be impossible to stock the substations along the trail and keep the construction camp supplied with the horse train alone. I therefore asked for a pack train of twenty mules, to be used over that part of the trail that had been completed from Valdez to the head of the Chena River, or station 3. From this point it was my intention to supply the construction camp by means of the horse train. On

the 20th day of August I was notified that the mule train had been shipped from San Francisco, and was due to leave Seattle on September 1 and arrive at Valdez not later than the 10th; but owing to the failure of the quartermaster at Seattle to promptly transship these animals, they did not arrive in Valdez until the 1st of October, when it was found that their condition was such as to render them unserviceable during the latter part of the season. The stalls prepared for these animals on board the steamer *Cleveland* were of such a flimsy, shoddy construction that the partitions were crushed in and five or six of the animals trampled to death while in transit, while all were more or less seriously bruised.

The packers sent north with this train, being natives of California and Arizona, were wholly unfit for the work in hand, and abandoned a cargo of supplies near the summit of Thompson Pass and returned to Port Valdez to be discharged. These supplies were afterwards packed over the pass by my Montana crew (92). The loss of the services of the mule train was particularly vexatious and, in my opinion, was entirely uncalled for, for had the stall accommodations been properly constructed there could have been no breaking of the side rails of the stall, and consequently no mangling of the stock.

The loss of the services of this transportation curtailed the season some fifteen or twenty days, which meant a corresponding reduction in the mileage of the trail of some 25 or 30 miles; for notwithstanding the fact that we packed the horses until they dropped on the trail from exhaustion, due to the insufficiency of food after the grass had been cut down by the frost, we were unable to get the supplies into the construction camp to keep the trail gang at work.

The most serviceable equipment operating in this country was found to be a pack saddle combining desirable features of the McClellan riding saddle and the Indian sawbuck (91). The Indian sawbuck, owing to the lowness of its crosstrees, has always been a horse killer, owing to the fact that it would invariably jam up the animal's withers in traveling down a long hill. To retain this crosstree, which was indispensable to the unskilled packer in rigging his squaw hitch with which to hold his load in place on the saddle, I took a very heavy McClellan tree, pared out the space under the pommel and cantle (so as to remove the pressure from the withers of any ordinary horse), and carved out a knob or hitching post on the top with which to rig the sling rope; gave the cantle about a 45-degree sheer and rigged the sides of the tree with iron loops for stirrup straps, so that, when not loaded, it could be used as a riding saddle. In place of the ordinary canvas cinch, which it was found soon rotted, I used the hair cinch of a riding saddle. For breeching and breast strap a padded canvas band was used which, when wet, molded itself nearly to the shape of the horse, and prevented chafing. For the use of small detachments with unskilled packers, I used large canvas panniers, reenforced with leather, provided with two leather sling straps that hook over the front and back knob of the saddle. These panniers were fastened under the horse's belly by means of a light cinch, which obviated the use of a lash rope. Owing to the heavy growth of underbrush, the picket line can not be used, but side lines, with animals that are hard to catch, were found to be very effective. Horse covers and cheap saddle blankets are valueless in the coast section, owing to constant rain, which renders it impossible to dry the rigging out. The shoe used was the "Neverslip Brand," which is an ordinary plate with two holes on each side, into which may be screwed four pointed cones, which were intended to take the place of heel and toe calks when traveling over icy surfaces. The valuable points of this shoe are that, when traveling through deep snow or shipping stock, these cones may be removed from the shoe, and thus eliminate the danger of a horse calking himself.

To prevent chafing the animal, in packing the hardware of a camp outfit, canvas pads fitting over the saddle are indispensable. The most important article of an outfit is a shoeing kit. Owing to the constant travel over wet ground, the animal's feet soon become soft and the pulling off of shoes a daily occurrence.

The equipment of a pack train for service in Alaska should be about the same, so far as involves the personnel of the train, as that in any other country, with the exception that the selection of a packer from the mountainous regions in the northern part of the States is almost mandatory to insure success in operating early in the spring or late in the fall.

MILITARY RESERVATIONS.

To equip this route with the necessary forage for pack animals traveling between Port Valdez and Fort Egbert, it will be necessary to reserve a number of hay meadows, so situated as to distribute the forage at points from 30 to 40 miles apart along the trail. The first of this series of hay meadows was located last August, near the head of the Kanata River, where some 40 tons of hay were cut and stacked.

The reservation selected by me in 1898 for the cantonment of the Alaskan Exploring Expedition No. 2, and which was used in 1899 by the Copper River Exploring Expedition, was found to be utterly valueless for any purpose whatsoever, owing to its liability to overflow from streams formed by the melting of the ice of the Valdez glacier during the months of June, July, and August. I therefore, in company with Lieutenant Babcock, topographical officer, and Edwin Gillette, engineer of the expedition, carefully inspected all available sites for a military reservation along the shores of Port Valdez, and as a result of that inspection, a site (150) was selected, designated on the accompanying map as Ludingtons Landing. The points of intrinsic value that recommend its selection are its water supply, which consists of a mountain stream that flows all the year round, carrying with it sufficient fall for all sanitary purposes; the proximity of deep water and good anchorage, where ships laden with building material can find excellent facilities for discharging their cargoes. The wood supply in the neighborhood of Port Valdez appears almost inexhaustible. With the aid of the steam launch pertaining to the expedition (135) rafts may be prepared and towed to Ludingtons Landing.

The topography of the mountains in the rear of this site are such as to offer a most excellent rifle range. It is just far enough from the head of Port Valdez to be beyond the influences of the whisky element to be found in frontier towns.

In the early part of June I inspected a large meadow at the mouth of Mineral Creek, almost opposite Ludingtons Landing, with a view to locating it as a hay meadow, but owing to the subsequent development of a local climatic condition that indicated more or less rain daily during the months of July, August, and September, I abandoned the idea of locating a hay ranch for the main station in Port Valdez, but am led to believe, from inquiry among the squaw men of Prince Williams Sound, that a hay reservation of ample proportions can be located at the head of Port Fidalgo, where there are no glaciers, and therefore free from local rains incident thereto.

THE DREADED SCORBUTUS OR SCURVY.

By LEROY J. TOWNSEND, M. D.

Scorbutus or scurvy, the most dreaded disease of the Alaskan prospector or miner, is a constitutional disorder, characterized by a vitiated state of the blood, dependent upon the lack of necessary elements supplied through fresh-fruit and vegetable nutriment. This lack or insufficiency in fresh-vegetable material is the essential factor in its development. Another factor is the long-continued use of salt or smoked meats. The use of stale or unwholesome food is still another. Indolence and inactivity are predisposing, and mental lethargy or depression is undoubtedly active in its production.

The changes in the composition of the blood show a marked diminution in the potash salts, and, contrary to a quite general belief, the blood is not thick, but thin and watery. Indeed, to this watery condition of the blood may be attributed the discolorations which manifest themselves during the disease, the liquid condition of the blood admitting of its passage through the vessel walls into and beneath the skin. The development of the disease is usually slow and insidious. The unfortunate suffers from malaise, and is indisposed to either mental or physical activity. Shortness of breath follows the slightest exertion, and palpitation of the heart is of frequent occurrence. Vertigo may be associated. Pain occurs in the knees or in the muscles of the calf or thigh, the muscles so contracting as to produce lameness. Œdema of the extremities,

particularly marked about the ankles and along the course of the tibia or shin bone, is an almost constant symptom. Puffiness of the face may be apparent. The pitting of the parts of pressure is marked. The skin is dry and harsh and presents extravasations of blood, in size from petechial spots to almost the whole surface of the part. These discolorations vary in color from a light red to a dark blue or black. Desquamation may follow over the ecchymotic surfaces. There is swelling and discoloration of the gums, which tend to bleed readily. The swelling may greatly interfere with the ingestion of food. The teeth loosen or drop out. The breath is terribly offensive. General weakness and depression is progressive, with decided emaciation. Anæmia is marked; the face pale, yellowish or leaden in color. The eyes are sunken and surrounded by dark circles, and in cases of long duration a characteristic odor has seemed to me to exist. The urine is high colored, abnormal in quantity in many cases, and loaded, becoming highly offensive if left standing. Hemorrhage may take place from various mucous surfaces. Fever of a remittent character is a constant symptom, the morning temperature usually registering 99½ to 100½. In the afternoon it reaches a degree or two higher. A good appetite usually exists, at least until the disease is far developed.

In such cases as progress unfavorably the weakness increases, the patient becoming unable to assist himself in the slightest degree. He soon lapses into a semicomatose or comatose condition, from which death relieves him.

Such complications as I have seen have involved the lungs and kidneys. I have had no case in which scorbutic dysentery has followed.

In diagnosis it would seem impossible to confound the disease with any other affection, especially when the condition is well developed. Yet the most astonishing errors were made in the Copper River region during the past year. Nor were these errors made by the laymen alone, but by presumably reputable physicians. For instance, one case that came to my notice had been diagnosed and treated as gangrene of the feet and legs, thought to have been produced by too tightly constricting the parts with cords used in tying gunny sacks over the feet and limbs. The marked extravasations were responsible for this mistake. The patient died. Again, another individual who had been unfortunate enough to have his toes frozen had the same cause placed on these offending members in explanation of scorbutic symptoms, which subsequently developed. Another individual in which the disease was just beginning to manifest itself was told that the pain and stiffness in his leg was due to a sprain, and the slight swelling and discoloration of the gums was the result of "frosting" them.

In general, through the opinion expressed by several physicians, the impression was that the condition was rheumatic. Black-leg rheumatism it was called. This was a most unfortunate mistake. The line of treatment instituted in these cases was directly antagonistic to the accepted lines followed in scurvy, and such as subsequently came under my care responded very tardily to antiscorbutic measures. Under this impression, too, many had taken the trail who, had they known that the developing pain was the forerunner of scurvy, would not have done so. Many of these unfortunates had to be hauled back, and much suffering and inconvenience was the result. The only disease which might be mistaken is a rare one known as peliosis rheumatica, or Schonlein's disease.

The above should be sufficient to place anyone on his guard, and with reasonable discernment he should be able to recognize the development of this dread malady.

In the consideration of treatment preventive measures should first receive attention. Citric-acid lemonade should be used frequently, from one to three times daily. It may be either sweetened or unsweetened and in strength corresponding with lemonade made from the fresh fruit. Lime juice may be used in the same way. Cider vinegar is of service. Dried or evaporated fruit and vegetable products will not serve as satisfactory substitutes. Canned fruits are of greater value. I would urge, too, that the Alaskan prospector and miner take a plentiful supply of milk, butter, sugar, and eggs (Lamont's crystallized). These articles should not be looked upon as luxuries. They are necessities.

In the interior a popular preventive and remedy was an infusion of pine needles. This was prepared by selecting limbs of young growth of the pine, stripping off the needles, putting in boiling water, and setting aside to steep. Some boiled the needles for a considerable time, mak-

ing a stronger decoction. Of this tea a fourth to a cupful was taken two or three times daily, as required. The inner bark of the willow and juniper berries were used in the same way. All of the above have proven to be of value. I did not prescribe them in my practice, but I am satisfied of their usefulness, and they are worthy of remembrance.

In direct treatment the indication is to supply as far as possible the principles needed for the healthy constitution of the vital fluid, the blood, and to directly change the environment which tends to the development of the disease. Place the patient in the best possible condition for the invigoration of the system. If possible, let him take gentle exercise. Supply fresh fruit and vegetables, lemons, oranges, apples, potatoes, onions, cabbage, etc., together with fresh meat, if available. Lemons probably give the quickest results, and it is astonishing the improvement that will follow their use. Raw potatoes are excellent. Divert the mind of the patient and inspire hope and cheerfulness.

Tonics are indicated. The tincture of the chloride of iron, the citrate of iron, the citrate of iron and quinine, or the citrate of iron, quinine, and strychnine, have proven of the greatest value in my hands. The mineral acids may be used to advantage. For the oral symptoms a wash of potassium chlorate will answer admirably, or one of boracic acid, or equal parts of boracic acid and borax, with a few drops of carbolic acid added. Attend to the secretions; keep the bowels open with mild laxative medicines. Relieve pain with anodynes, resorting, if necessary, to morphine. The use of hot-water bags for relief of pain in the limbs or back is excellent. The application of plasters may be beneficial, as well as hot fermentations. Other symptoms must be met as they arise.

I believe that operative procedure is contraindicated when scorbutus exists. In two cases operated upon the greatest difficulty was experienced in controlling hemorrhage. In neither case was there manifest symptoms at the time of operation, but symptoms developed very soon after. Considering the blood changes, difficulty in stopping hemorrhage might be expected.

To my knowledge, no cases of acute rheumatism, of typhoid, cerebro-spinal, or other fever developed in the Copper River region.

Considering the hardship and exposure undergone, it is surprising that so little sickness resulted.

FROM PORT VALDEZ TO KLUTENA VIA VALDEZ GLACIER.

By JOHN F. RICE, Quartermaster of the Expedition.

I left Valdez Thursday, May 4, at 3 a. m. The party consisted of Private Garrett, John Frolin, dog driver, and myself. We took with us a team of 5 dogs, provisions, sleeping bags, and other articles necessary for the trip.

After traveling some 4 miles we reached the foot of the glacier. To our great disappointment we found no snow whatever there. The glacier at this point was covered with rocks, caused by the many snowslides from off the mountains. We were compelled to pack our outfits up over the second bench. The dog team was hardly able to pull the empty sled, the ascent in several places being nearly perpendicular. On our arrival at the second bench we again packed our outfits on the sleds and proceeded on our way until we reached what is known as the relief station. The station consists of a skeleton frame with a tent stretched over it, constructed by Captain Abercrombie in the spring of 1897 for the relief of parties crossing and recrossing the glacier. Upon our arrival at the station we found an oil stove and the necessary cooking utensils. We also found a large amount of hard tack, placed there for the use of unfortunates detained on the glacier for any length of time.

On leaving there we continued on our journey, but had not traveled far before encountering a blinding snowstorm. However, the trail was easily followed and we felt no alarm whatever. We finally reached the foot of the glacier, after having traveled some 15 miles. Here was located another relief station and upon entering the same we found a prospector. This man started to haul his cache back to Valdez, but becoming snow-blind was compelled to take refuge

in the relief station. He informed us that he had been living on the glacier for some nineteen days and had given up all hope of getting off, being physically and mentally broken down. We waited at the station some time for the storm to abate, but the longer we remained the fiercer it raged, so we concluded to make an attempt to cross the summit of the glacier that evening. After traveling some few rods from the station we fully realized how difficult was the task we had undertaken, the summit being some 4,800 feet high and the ascent some 1,500 feet to the mile. At this time it was impossible to find the trail, much less make any headway, as the snow was about fourteen inches deep. The storm had changed to a raging blizzard, and as we were unable to see any distance ahead of us, we would often be brought to a halt on the edge of a crevasse 100 feet deep. At last, after several hours' hard travel, we managed to reach the foot of the glacier. Arriving there we found three more prospectors who had pitched their tent at that point, being afraid to venture across the glacier until the storm had abated. One of the party had contracted scurvy and was unable to travel. The only possible way for him to reach the coast was for his partners to sled him across the glacier which I afterwards learned they did.

We again found the trail and had no trouble in getting down to Barrett's camp. After resting there for a few minutes we continued our journey down to the foot of the glacier, arriving there at 10.25 p. m. As we had now traveled some 35 miles we concluded to remain there over night.

At the foot of the glacier we found ten or twelve cabins, all deserted with the exception of one. Upon going up to this one we found an old German who seemed very indignant at us for disturbing his sleep. We learned that the night before some miscreant had broken into his cabin and stolen a considerable portion of his cache, including his gun and ammunition. Upon telling him that we were connected with Captain Abercrombie, he concluded to take us in for the night.

The following morning we resumed our journey. The snow had become soft and it was torture to continue for any distance, so we concluded to make the Saw Mill Camp and remain there until the weather should clear. Unfortunately, it did not clear as we expected, and we were obliged to remain there for two days and two nights. On the morning of the 7th the weather had improved somewhat and we were enabled to proceed on our journey. Upon our arrival at Lake Abercrombie we found a crust on the lake, and we rode some 22 miles across the same. After leaving the lake we proceeded down the Klutena River, but after traveling a few miles we found the river open and hardly snow enough along the bank to sled our outfit. The dogs at this time were practically of no use, owing to the bad condition of their feet, caused by traveling over the many rocks that lined the bank. Finally we reached Klutena Rapids the following evening. Here we found about fifty cabins. But three of them were occupied at the time. Upon inquiry I learned that most of the inhabitants had either left for the States or other parts of the country. Before leaving, I learned that a large amount of stores were situated at Copper Center, and that the owners were willing to trade them for like stores at Valdez. I therefore recommend that you establish another station at Copper Center for the relief of the prospectors in and around that locality, as well as for those coming down the Copper River.

After establishing a station at the rapids, and leaving Private Garrett in charge, we started on our return journey to Valdez about 1.30 a. m., May 10. The weather was delightful, and the snow having a fairly good crust, we were enabled to make exceptionally good time until about 1 p. m., when the crust became soft. We then resorted to snow shoes until after crossing the summit of the glacier, where the crust was again sufficiently strong to sustain our weight without the use of snowshoes. After trudging along for about seven hours, we arrived at the relief station, where we concluded to remain over night rather than take any chances in trying to get down over the third bench. The third bench is one of the most dangerous points on the glacier owing to the many crevasses and snow slides. The following morning we left the relief station and proceeded to Valdez. The trail was fairly good until we reached the second bench, where we were again compelled to pack our outfit down to the foot of the glacier. From there we sledded our outfit to Valdez, arriving there at 1 a. m., May 11, 1899.

THE TRANS-ALASKAN MILITARY ROAD.

By First Lieut. WALTER C. BABCOCK, Eighth United States Cavalry.

My instructions placed me in charge of the substations along the military road. Station No. 2, the first one constructed, was some 16 miles east of Valdez at the head of the flood plain of Lowe River at the base of the mountains (29, 30) near the entrance (27) to Keystone Canyon. This substation was established on April 29, when the first pack train left Valdez (26) carrying rations and camp equipage. The train was composed of 30 pack horses, each loaded with 200 pounds; 2 horse sleds, 6 packers, 2 sled drivers, 1 camp cook, and myself.

At station No. 2 a log storehouse was constructed, 15 by 30 feet inside (99). The walls of this structure are about 10 feet high, the roof steeply pitched, and the ridge lengthwise with the building. While the storehouse was being constructed, Mr. Palmer, topographer, was at work looking for a suitable line for the road and blazing it out for the brush cutters. The line of this road started a quarter of a mile west of the storehouse on the north side of Lowe River Valley (28, 45) and ascended the mountain with many switchbacks and turns in order to maintain a suitable grade. At the early date mentioned the valley was more or less covered with snow, which was why the work was begun from station No. 2. By May 26 work had progressed so far that much time was lost by the construction party. It then became necessary to establish a new construction camp nearer where the work was being performed.

It was at this point that the real difficulties of road building began. The new camp was near the edge of Keystone Canyon, on the only spot within 3 miles where a site for so large a camp existed. Keystone Canyon extends from north to south for about 4 miles, flanked on both east and west with steep mountains 4,500 to 5,700 feet high (32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 47). On the east side the walls of the canyon are from 800 to 1,300 feet in height and very steep throughout. Near the middle of the canyon is a sheer rock precipice, one-half mile in length and 800 feet high, departing but a few degrees from the vertical. On the west the canyon wall is nearly vertical to a height of from 300 to 450 feet, above which the slope is less steep, thus forming a natural bench, more or less well defined. It is along this bench that the road is built. In several places the rock walls of the canyon extend above this natural bench and through these ledges the road had to be cut. Between station No. 2 and the end of the canyon some 600 cubic yards of rock were cut out, to say nothing of the breaking up and removing of enormous bowlders, fragments from the cliffs above, that were scattered along the route.

By the end of May work had settled down to a regular routine. The lazy and disgruntled men had been weeded out. Every man understood what he had to do and did it willingly. The foreman of the working party, Mr. Holland (105), handled the men well. The Government was getting a road built cheaply. The workmen were getting a road from the coast to the interior that would pass their mining claims and they were getting paid for building it. I have never seen a harder working or more faithful lot of men.

Far in advance of the construction party were one or more men, familiar with the country, sent in to look up the general route ahead and report on the grades, state of the glacier streams, nature of the ground, etc. Just in advance of the workmen went one or two men to blaze the actual line through the timber and thick brush. The work of this party was the most exhausting of all.

On the steep sides of this canyon the brush, mainly alder, grows in a dense mass, 20 feet or more high, and is twisted and intertwined in an inconceivable tangle. The heavy snows of winter bend these bushes down to the ground and give them such a set that when the snow disappears in the spring they stand out from the ground at an angle of about 40 degrees. Thickly interspersed with this alder brush and growing straight up are devil clubs, covered with sharp, barbed spines. The effort of climbing over, under, and through this brush on a side hill so steep as to scarcely afford a footing, falling, stumbling, grasping at the devil clubs, bruised and beaten by the stout alder branches and, at the same time, endeavoring to blaze out a line with a uniform grade or on a level is simply inconceivable to one who has not tried it. Frequently this has to be

done many times before a line is secured that is considered the best possible. The first trip of this kind along the sides of Keystone Canyon required six hours to make 3 miles, and this was followed by the return trip, over a slightly different line, back to camp. This was done four times before the present route was selected.

Every inch of the route has to be covered by an advance party in this way before the work on a new section can be commenced. The country is full of surprises. In one case, without a personal investigation on my part, I took the word of one of my men, who had been in advance, that a straight transit line could be run through a dense cottonwood forest for 2½ miles in a direction to reach a glacier stream at a point selected for a bridge. On running the transit line for 1 mile I came to a swamp and bog, not of great extent, but so large as to necessitate a change of route. The man in advance had passed through the timber and brush a quarter of a mile nearer the mountain and, crossing no stream, had very naturally concluded that the ground was dry and solid farther out. The result was a delay of one and a half days and a lesson to myself. Thereafter I never failed to go over the line in person before deciding on the route.

On a new and untouched portion of the route, the axmen preceded, clearing the ground of all brush, trees, and fallen timber. They were followed by a second party, with picks, crowbars, and shovels, that graded the trail, often cutting deep into the side hill to gain the necessary width for the road and removing all obstructions but the heavier bowlders and the solid rock. The rock workers followed with blasting powder and drills and removed all rock too heavy or hard to be moved and broken up by picks and bars. Lastly came two or three men with sledge hammers, who broke up fragments of rock left after blasting and scattered it along the road as ballast.

The mountain sides were so steep that the axmen had to support themselves by hanging to the brush with one hand while they chopped with the other. At times the graders had to make vertical cuttings of 15 and 20 feet in order to gain a horizontal width of 5 feet for the road. In the first 4 miles from station No. 2 fifteen mountain streams were crossed. Eleven of these streams ran in deep gullies, across which retaining walls were built and the space thus inclosed filled up with loose rock through which the stream could pass. One wooden bridge was constructed in this section. Work over the 4 miles through the Keystone Canyon was the most difficult of any encountered during the season.

Once through the Keystone Canyon, the valley turns to the eastward and widens into what is locally known as Dutch Flat (48, 49). Along this flat two swift glacier streams empty into the Lowe River through deep canyons from the north and another, the south fork, from the southeast. The mountains on either hand are very steep, rising abruptly from the gravel flat (41, 50, 106), but having well-defined benches (107), nearly level, and following the contours of the mountains. The road by a very gradual grade from the canyon entrance drops to the lowest of these benches on the north side of the valley, and follows along it a distance of 2 miles to the point of crossing the first glacier stream.

Here a bridge was necessary. The stream in the early spring is a mere clear-water mountain brook, which one could easily cross dry shod. In midsummer, it is a boiling, surging glacier stream, 8 to 10 feet deep, with a current of 15 miles an hour; crashing together the bowlders in its bed with great noise and bringing down large pieces of ice (55). To attempt to ford it at high water would be suicidal. On the farther side a natural rock abutment was found, opposite to a spot where a crib could be constructed on bed rock. This crib was put in place and many of the longer bridge timbers cut before the main working party reached this point.

This bridge is a type of all the larger bridges constructed along the road (46). The crib is of rough rhomboidal shape, the acute angles pointing up and down the stream, and is built of large spruce timbers notched together at the corners, and is of such a height as to place the deck of the bridge some feet above highest water. The inclosure thus formed is filled with large bowlders and rock. The deck of the bridge is supported on five spruce stringers, 14 to 16 inches in diameter at butt end and resting on the crib and natural abutment, a span over the stream of 38 feet. From the crib to the cut bank of the stream, a distance of about 30 feet, four stringers

were laid, all of them notched and pinned firmly to the crib. On the stringers were laid crosswise logs, 6 inches in diameter, cut to lie close together and notched to rest solidly on the stringers. Every 5 or 6 feet one of these was pinned at both ends to the outer stringers. On the top were laid side rails at either side, also pinned down. The projecting ends of the cross timbers were then neatly sawed off.

By July 18 over 8 miles of road had been constructed from station No. 2 and to within 4 miles of the summit, including four bridges, two of them over 60 feet long. Upward of 617 yards of rock had been blasted and 600 yards more broken up and moved by hammers and bars. Retaining walls across narrow ravines had been built and the whole trail graded and ballasted. This work had been accomplished in one and a half months, over the most difficult part of the route, with an average of 15 workingmen.

In the construction of bridge No. 4, that over the second glacier stream (52) emptying into Dutch Flat, there were many difficulties to be met. At this time, the middle of July, the streams were high. This one was some 50 feet wide and 10 feet deep at the bridge site and rushing through at a speed of 14.7 miles an hour. Timber of a length sufficient to cross this stream with one span could not be obtained in the immediate vicinity, and consequently three cribs had to be constructed. The first, a low, small one, was on the shore; the second was placed in the stream, one-third the distance across. It was built on shore, 10 feet high, of the largest timbers, and was made very strong to withstand the enormous force of water and the blows of large cakes of ice brought down from the glacier. It had to be moved out into the stream through the boiling, swirling water, to a depth of 5 feet, and there sunk and ballasted with rocks and bowlders. The first attempt was a failure, the crib being washed away before it could be secured in place. The second attempt succeeded. The third crib was near the farther shore, in slack water. Most of the stringers for the bridge were found only on the farther shore, at a distance of from one-half to three-fourths of a mile from the stream. The trail had not been cleared on the farther side, and the brush had to be cut away for each log from the place where it lay down to the stream before it could be hauled to its place. The total length of this bridge is 112 feet, with four spans, the largest 38 feet.

From this bridge to the summit of Thompson Pass (48), the road ascends by a nearly uniform grade of about one in ten. Thompson Pass, the lowest practicable route over the divide between Lowe River and the Chena, has an elevation of 2,840 feet and rises above the river 2,100 feet. From its summit down to the Chena, a distance of about 7 miles, the drop is only about 700 feet along Ptarmigan Creek.

For 1 mile from bridge No. 4 the work was comparatively easy, there being but little grading necessary and but few streams to cross, practically the only work being to clear the route of brush and fallen timber. The next three-quarters of a mile was along a steep hillside between what is known as the first and second benches. The line for the road was over enormous bowlders of many tons weight, covered with deep moss and vegetable mold, and the whole overgrown with alder and devil club. Clearing the brush and scraping away the moss revealed great gaps and crevasses between the bowlders, which had to be filled with broken rock and the corners of the bowlders broken off. This rock is of a light-green color and very hard and heavy. Drills were frequently broken, and two men were kept constantly at work at the portable forge resharpening.

Arriving at the second bench, the work again became easier and the brush much lower and less thick. The last 2 miles toward the summit are practically free from brush and the ground hard and no work was required.

By July 27 the road was completed to the summit of Thompson Pass. During the month preceding there had been much travel on the road. The coming and going of the pack train every few days, bringing supplies from Valdez and station No. 2, had packed the trail hard through the Keystone Canyon and had discovered all weak places. A man was furnished with tools and detailed to patrol the road from station No. 2 to the summit and repair the road wherever necessary. This was kept up until the departure of the expedition in October.

Many prospectors (119) were constantly coming and going over the road, and all expressed

their satisfaction and relief at having a road to travel that avoided the dangerous Valdez Glacier and shortened the journey from the interior by several days.

A carefully contoured map of the region traversed by the road was prepared, the line of the road carefully plotted, and levels run over the entire distance to the summit of the pass, and a profile constructed. Elevations of all mountain peaks were carefully determined.

ADVANCE LOCATION FOR THE ROAD.

By the middle of July I found it necessary to personally determine the route for the road far in advance of the working party, and on the 27th left the construction camp with a small party for that purpose. My instructions were to prepare a topographical map of the country traversed, locate the route for the road, making careful measurements of the distance, and continue the photographic work along the route selected for the road. I was to proceed as far as possible and return to Valdez not later than October 15. I made my outfit as compact and light as possible, and took with me Mr. Worthington as a transit man and two packers, one to work as rodman for Mr. Worthington and one to cook and care for the horses while in camp. Four strong pack horses carried our sleeping bags, shelter tents, two changes of clothing, thirty days' rations, camera and supplies therefor. The transit, level rod, axes, rifle, and shotgun were carried by hand.

From the summit of Thompson Pass my route was down Ptarmigan Creek to the Chena, the south fork of the Tiekell River. The descent to the Chena is about 7 miles, with a gradual drop of about 700 feet. The ground much of the way along Ptarmigan Creek (108) is soft and boggy and is crossed by many small glacier streams. All of the Alaskan glacier streams, be they large or small, should be treated with the greatest respect. The last one feeding Ptarmigan Creek from the west came near being disastrous to my expedition.

To follow down the Chena along its bottom for any great distance was impossible. It was a larger river than any I had yet encountered. At the mouth of Ptarmigan Creek and for some miles below (53, 54) it flows over a wide gravel bed in many channels, all too deep or swift to be forded at this season, often coming close (110) to the steep ridges that limit its valley on the south side. Mr. Worthington and myself extended the map up the Chena some miles and looked over the vicinity for a suitable route for the road. I finally decided on a line on the east side of Ptarmigan Creek, high up on the mountain sides, and descending by a slight grade to the Chena Valley. This location avoided a crossing of Ptarmigan Creek and placed the line far above all soft ground in the bottom, crossing the glacier streams where good fords could be made. Six streams were thus crossed between the summit of Thompson Pass and the Chena without the necessity of bridging them. Arriving at the Chena Valley, the road turns gradually more to the eastward and runs along the mountain side, gradually descending to a point some 3 miles below the mouth of Ptarmigan Creek. At this point, safely above the river bottom, station No. 3 was established and two buildings afterwards constructed there, one as a storehouse, and the other as a cabin for the storekeepers (56).

The next work was to decide on a site for a bridge over the Chena. This river from a point some miles above the mouth of Ptarmigan Creek to a point 4 miles below flows over a gravel flat in many changing channels. To construct a bridge over this part was out of the question. This flat becomes gradually narrower until a point 1½ miles below station No. 3 is reached. Here the river in one channel enters a canyon with vertical rock walls 30 to 60 feet high. A mile farther down, near a prospector's camp, known locally as "The Major's," was a foot log across the canyon, placed there and used by prospectors. The width at this point was about 40 feet. Not far distant from this point good timber was found in abundance. It was here that the bridge was finally located (57, 58).

The thick brush and rapid current of the river made it impossible to locate points by triangulation by working back and forth across the valley, and resort was therefore had to careful stadia measurements for distance and the results plotted at once. By proceeding in this way an absolute measured base line was available at all times from which horizontal and vertical angles to all visible

points could be measured. This method was followed from the beginning to the end of my trip. The work was slow, as the brush had to be cut away for nearly every sight with the transit, but I believe this method gave the most rapid progress consistent with reliable results. The map was also complete each day up to the point where work was stopped for the night.

The canyon of the Chena continues for about 5 miles below this foot log, widening occasionally, but narrowing down again. Near the lower end of this canyon I found a second place where a bridge could be built. Here there were rocky points 8 and 10 feet above the water, extending into the stream, making the span about 45 feet. I did not attempt to decide which was the better of the sites, as so much depended upon the nature of the ground below the upper site on the farther (north) side of the river, and this ground I had not explored. The main point was that the sites for a bridge existed. Below the Chena canyon the valley widens again and the stream spreads out into many channels and flows over another gravel flat (109).

From this point our route lay over the divide between the Chena and the Kanata (109), the south and the north forks, respectively, of the Tiekell. The passage of this divide was entirely free from brush, for a recent forest fire, still smoldering in the fallen logs as we passed, had cleaned the ground of this obstruction. The absence of all underbrush was amply compensated for by the charred and half-burned spruce trees laying crossed and piled up on all sides. Through this tangle we had to cut a path for the horses with small hand axes. It took hours to cover the 3 miles to Stewart Creek or River, the last tributary of the Chena from the northwest.

We remained camped on Stewart Creek for several days while the section was mapped down to the junction of the north and south forks of the Tiekell and well up the North Fork. The elevation of our camp on Stewart Creek, about 1,500 feet above sea level, was the lowest point reached since leaving Thompson Pass. Our route was now up the Kanata or North Fork of the Tiekell. This stream, unlike the others we had passed, is not a glacier stream. Many of its branches flow from clear mountain streams and from a large swamp near its head. It flows through a valley averaging half a mile in width, and its general course is from north to south on the arc of a rough half circle with the bend toward the west. The stream is an extremely crooked one, doubling back on itself and crossing the valley back and forth many times. Throughout its course are deep pools, close in under low-cut banks, while on the other shore opposite each pool is a broad brush-covered bar (66). The brush on both sides overhangs far out into the stream. Its current is less rapid than that of the other streams we had passed, and its channel is constant, there being no evidence of any recent change.

Steep mountains lie on either side, 6,000 to 7,500 feet high. The valley is covered throughout with fine spruce and cottonwood timber, with a dense undergrowth of scrub willow, alder, wild currant, and wild rose. Along this valley the timber line extends much higher up the mountains than it does nearer the coast, reaching an elevation of 3,000 feet. The brush disappears at an elevation of about 4,000 feet. On the coast about Valdez Bay timber is rarely found at an elevation of 1,000 feet, and the underbrush disappears at 1,800 to 2,000 feet. In a general way, it may be stated that the brush line is about 1,000 feet above timber.

It was along the Kanata that we made our slowest progress. It required five days to run the stadia measurements over the 7 miles from Stewart Creek to Bowlder Creek, near which our next camp was located. On one day we traveled only three-quarters of a mile in distance, and throughout the trip up this stream we had to cut the brush before stadia measurements could be made.

Along the banks of Bowlder Creek some prospecting was being done, and a little desultory placer mining, without any paying results. Fine flour gold is found in all the tributaries of the Tiekell, but is too fine to be saved by ordinary panning or rocking, and nowhere sufficiently plentiful to pay for the labor of working a claim. The Tiekell Valley has not been penetrated by prospectors until the preceding fall and winter, and yet the banks of the Kanata, or North Fork, and its larger branches, were everywhere staked off into placer claims, each with a location notice written on the stakes. Most of these claims were abandoned; at least there was no evidence of any assessment work having been done.

Beaver dams were frequent along the Kanata, but all the beaver had been killed off. This

stream ought to be a fine trout stream, but no trout or fish of any kind have ever been found there, or in fact in any of the tributaries of the Tickell. Long, swift rapids below the main forks of the river prevent the fish from coming up from the Copper River.

From Bowlder Creek my route was over the Quartz Creek Divide, and down that stream to the Tonsena River. This was not to be the route for the road, but I desired to survey the Quartz Creek Valley and Tonsena or Archer Lake, which lies just above the mouth of Quartz Creek, neither of which had ever before been mapped. Leaving Bowlder Creek, we climbed nearly straight up the sides of Mount Rice, the average slope of which is 40° over a trail cut the month previous by a party under Mr. Rice and Inspector Wayland. After reaching an elevation of about 4,200 feet and well above the brush line, we turned northward and proceeded along the mountain side a distance of 3 miles to a point near the source of Quartz Creek.

Quartz Creek is a clear-water stream, about 12 miles long, flowing from a bog near the summit of the divide in a northwesterly direction and emptying into the Tonsena River, just below the lake of that name. About 5 miles above its mouth its two main branches empty into it, viz, Rainbow Creek from the northeast and Bear Creek from the southwest. At the mouth of Bear Creek is a mining camp of eight or ten log houses and the post-office of Belcaro, the latter established by Post-Office Inspector Wayland late in June. Upper Quartz Creek is about 1 mile wide and very boggy in summer, the soft, wet ground extending well up the mountain sides even where there is a considerable slope, the thick moss holding the water like a sponge. Half way down the soil becomes gravelly, the stream more confined, and a short distance below Bear Creek flows through a deep canyon for a mile or more. Below the canyon the valley again widens, and gradually merges into the broad, timbered flats that border the Tonsena.

To pass the canyon of lower Quartz Creek, we were again obliged to make a steep ascent to an elevation of 4,000 feet, shortly to descend again to the creek bottom below the canyon. Arriving at Tonsena Lake, near its outlet, I made camp, in order to survey the lake and river above and below.

Tonsena, or Archer Lake, lies in a picturesque valley (111), the mountains rising abruptly from the water to a height of 6,500 or 7,000 feet on all sides except the north (112). The lake is irregular in shape, with a decided bend toward the west, and has its greatest length of 9 miles from north to south, with an extreme width of about 2½ miles. At the south end of the lake the Tonsena River empties into it and is its main supply stream. Several other smaller streams empty into the lake from both east and west, and all, with one exception—Manker Creek—are glacier streams. Consequently, the waters of the lake are crowded with fine glacial silt. The ground at the head of the lake is swampy and overgrown with tall, rank grass, which is a favorite hiding place for hundreds of ducks of all kinds. The valley above the lake narrows considerably, but is still of sufficient width for some miles to form the bed for many smaller lakes, which line the river on both sides (113).

Toward the northern end the mountains gradually recede from the lake (112), and at the outlet the valley is about 3 miles wide, thickly grown with spruce and cottonwood and with a dense undergrowth. The banks of the river below the lake are low and flat and frequently swampy. Below the lake there are no large tributaries of the river. The only stream of consequence coming from the west is Manker Creek, which empties into the lake a mile from its outlet. On the east side there are three streams, all running clear, reaching the Tonsena River between the lake and a point 23 miles below.

The Tonsena River and all its branches abound in salmon, and all of the streams, large and small, are crowded with the finest brook trout from 10 to 14 inches in length and beautifully marked. In the timber along its shores grouse are plentiful, and the southern end is a great bear country. Wild red currants grow in great abundance all about the lake, surpassing in size and flavor any cultivated berries I have ever eaten. Many other varieties of berries are found here—the salmon berry and raspberry, blueberry, black currant, and others—but none are so plentiful or can compare in flavor with the red currant.

Orders were also received directing me to proceed back to the Kanata and follow up that stream. I accordingly left the lake August 27, and proceeded back up Quartz Creek, stopping

long enough to survey Bear Creek and Rainbow Gulch. From the Quartz Creek summit I descended to the Kanata over a route that brought us to that stream some 4 miles above where we left it on the advance. This route is known to prospectors as "The Drop," and has a very steep descent of 2,100 feet. Here along the mountain sides, above the brush and in open parks in its midst, grows a fine, rich grass. Forty tons of this grass were afterwards cut and hauled down to the stream to where a log stable was later constructed, and in which the horses of the expedition were to winter.

Our progress up the Kanata was very slow, owing to the thick brush, our measurements averaging but little more than a mile per day. It was at our next camp, some 4 miles above "The Drop," that we experienced a severe earthquake shock. This was on Sunday, September 3, at 2.28 p. m. It was a new experience, and not a pleasant one. I realized at once what was occurring, and carefully noted the duration of the shock. It began gently, gradually increasing in violence until it became impossible to stand erect, and then gradually decreased. The shock lasted one minute and ten seconds. The vibrations were from north to south, and were so violent that one could actually see the ground move. The sensation experienced was not so much that of fear as of utter helplessness, accompanied by a slight nausea resembling seasickness. After the shaking had subsided we heard eight muffled reports, sounding more like distant gunshots than any other sound, occurring at intervals of about twelve seconds. At 7.30 p. m. there was another light earthquake, lasting three seconds and preceded by one of the reports above noted. It was reported to me some days later that Tonsena Lake dropped 2 feet after the shock, but this I had reason to doubt. On the following Sunday there were six more earthquake shocks, commencing at 7.08 a. m. and occurring at irregular intervals up to 11.45 a. m. The last was the most severe, and lasted over a minute. After the last one we again heard the peculiar reports above noted.

Fall Creek and Ernestine Creek are the two largest branches of the Kanata and both enter it from the southeast, their mouths about 2 miles apart, and both have their sources in glaciers. Gold has been found in paying quantities in both streams, and claims on both of them were being worked at this time.

Above the mouth of Fall Creek the valley of the Kanata widens somewhat, the timber is less dense, the ground becomes softer and finally boggy. The grass grows in bunches, the roots forming large hummocks. On the eastern side of the valley, at the base of the mountains, is a long, low, gravelly ridge, rising 50 to 100 feet above the marshes. It is along this ridge that the road should be built, crossing the Kanata at the mining camp just below Fall Creek. To continue the road up the west side above Fall Creek is out of the question. The stream must be crossed sooner or later and here is a good site for a bridge. I believe the stream could be forded here at all times, but of this I am not certain, as at the time of my crossing the river was not at its highest. The mountains approach close to the river on the west above Fall Creek. The bank is gravelly, and from time to time caves in, carrying down large trees and bowlders. To build the road above the immediate bank of the stream would entail a considerable ascent, with much sidehill grading and probably rockwork.

The source of the Kanata is a swamp, thickly overgrown with dwarf willow and sparsely timbered with small, but tall spruce trees. The elevation of this point is about 2,300 feet above sea level, making the ascent from the forks of the Tiekell, a distance of about 18 miles, only 800 feet. The divide between the Kanata and the south fork of the Tonsena is a low ridge, imperceptible from any distance (114) and would be difficult to locate without actually going over the ground. Both streams have their source in swamps. Two men in a few hours could dig a trench connecting both streams. To do this would be a public-spirited act, as it would be the means of filling the Kanata and Chena and their branches with the finest kind of trout and salmon.

In the meantime the valley of the Tonsena South Fork, or Mosquito Creek, as it is sometimes called, was thoroughly explored on both sides. This valley is from 1 to 2 miles wide and bounded by steep mountains 6,000 feet high. Its direction is northwest, and throughout its entire length of about 20 miles it is an immense swamp, grown with thick dwarf willows, 6 to 8 feet in height, with patches of timber here and there.

On the west side of the valley is an old Indian or Russian foot trail. It had evidently been

much used at one time, as there were numerous signs of brush cutting done many years ago and the trail for long distances was worn down a foot or more below the natural surface. This trail was followed for 3 miles, when it turned to the right and evidently crossed the swamp. No further trace of it could be found on either side.

A man named Tjosvig, who reported to me as a packer and cook, stated that a pass existed through the divide between this valley and Bernard Creek, the next stream below, which pass, if practicable, would shorten the distance to the Tonsena some 3 miles. Besides, by avoiding the trend to the northwest of the South Fork, it would give a more direct route to the road. My first exploration of this pass, which I named Kimball Pass (115, 116), led me to the conclusion that this route was not feasible because of the additional ascent of 1,600 feet.

I decided to run the line down the South Fork of the Tonsena when new horses arrived and instructions received to push on as rapidly as possible to the Tonsena River, clearing the trail of brush as we went. Arriving at the Tonsena, I was to select a site for a storehouse and cabin and meet parties coming from Tonsena Lake, who were to build it.

To make a proper beginning for this trail cutting, it was necessary to go back to the crossing of Ernestine Creek, half a mile in the rear. About 1 mile per day was our average progress. Eight miles had been cleared when the ground became soft and boggy, although the line was some 300 feet above the valley bottom. The outlook ahead was most discouraging, there being still some 12 miles more of this work before reaching the Tonsena, and I decided to once more make an examination of Kimball Pass. To do this thoroughly I believed would require a long day's work. We started at 4.30 a. m. and traveled continuously until 6.30 p. m., having made a circuit through Kimball Pass down Bernard Creek a long distance and then again through the divide over a saddle known as Big Stone Pass, 5,600 feet high. From thence we proceeded along the mountain side back to our camp, a total distance of 13 miles, one-half of which was through thick alder and willow brush (117). The trip had not been in vain, for I learned that the proper and only route for the road was through Kimball Pass, provided a suitable grade could be obtained on the ascent to its summit.

My next work was to determine this point. The day following I started at the summit of this pass and blazed a line through the brush, gradually descending by a grade of about one in ten to the trail which we had already cleared, striking it about 2 miles from Ernestine Creek.

Early the following morning we set out for Big Stone Pass, this being the shortest route to Bernard Creek and lying far above the brush line. I determined to push on as far as possible down Bernard Creek, abandoning all survey work. By 3 p. m. we had made about 10 miles, and shortly after got into the brush, which was so thick that our horses could go no farther. Here I made camp. The next day we started for the Tonsena, turning the horses loose at the camp. The cut banks of the Tonsena appeared about 5 miles distant, but it turned out to be somewhat more than 9 miles away. This was through the densest brush, and for the last 2 miles over an enormous windfall of spruce and cottonwood timber.

Bernard Creek differs from the South Fork of the Tonsena in having its source in a small lake (115), on the summit of Kimball Pass, at an elevation of 4,000 feet, and being more confined in its course. It is about 20 miles long and flows through a narrow valley with a gravelly soil, thickly grown with a tough wire brush. Its lower half is between high-cut banks, broken at frequent intervals by deep ravines. Along its banks and along the Tonsena near its mouth grow the largest of spruce trees, 100 feet or more high, and many measuring 3 feet or over in diameter at the base. The Tonsena Valley about the mouth of Bernard Creek is of a similar character, but much wider, with the cut banks averaging 250 feet in height.

Nearly opposite the mouth of Bernard Creek another stream known as Trout Creek empties into the Tonsena, its valley being like that of Bernard Creek. At this point is a good bridge site, and the route up Trout Creek is in such a direction as to reach the Klutena River at the point selected for crossing, some 8 or 10 miles above its mouth. The last mountains on the Coast Range lie on the east side of Trout Creek and separate it from the Copper River Valley. I do not think this route for the military road could be improved upon. The distance is the shortest to the crossing of the Tonsena. The ground is good all the way from the head of the Kanata, the grades are light, and the line up Trout Creek to the Tonsena is over a low saddle with very light grades.

On October 1 I turned back to take charge of the construction camp at Valdez. Snow had been falling for two days. The grass was becoming poor and promised to grow poorer as the days advanced. As we neared Big Stone Pass I climbed to a low summit near by to get photographs of the Copper River Valley. It was a most remarkable day for this region. The atmosphere was unusually clear and the high snow-covered mountains of the Alaskan Range, 200 miles to the north, were clear cut against the deep-blue sky. To the east the Mount Wrangell group stood out clear from base to summit. Mounts Drum, Tillman, and Sanford had not a cloud about them, a most unusual condition, while the puffs of white, steam-like smoke from the volcano Wrangell were sharply outlined against the sky. Here was the photographic opportunity of a lifetime, and I exposed many plates. All of them, for reasons that I explain in my photographic report, were utter failures.

The trip back to the construction camp was over the route followed on the advance and was uneventful.

It continued to snow and I began to fear trouble in crossing Thompson Pass, and on October 5 ordered the return of the personnel to Valdez. The first day's trip was a long one of 16 miles to the relief cabin on the Chena, situated a mile below the mouth of the canyon. We crossed the Stewart Creek bridge and the long bridge over the Chena and followed up that stream 2 miles to a point above station 3, the nearest point at which grass for the horses could be found. I so arranged it that the horses had light loads for the passage of Thompson Pass. On the ascent (118) to the summit of the pass one of the horses gave out. We found on or near the summit about 30 inches of snow. We had considerable difficulty in getting through the drifts. The view of Dutch Flat from the summit was most surprising. For 10 miles on the north side I had come through snow from 6 to 30 inches in depth, while in Dutch Valley there was no snow whatever and much of the brush and cottonwood timber was still green and untouched by frost. The snow on the divide became less and less deep, and disappeared entirely at about the 2,000 feet elevation. We reached Valdez October 10 without mishap.

Summary of construction work.

Total length of road—	Miles.
For pack horses	93
In excavation	35
Cleared and grubbed	67
Cleared only	12

Twenty-six bridges were constructed, exclusive of small culverts, with a total length of 856 feet. The largest bridge is 121 feet long. These bridges have 40 spans, the longest span of 40 feet being in the bridge over the Chena Canyon. Two bridges have 4 spans each and three others have 2 spans each. Eighteen spans measure 25 feet or over. Nine log cribs were constructed. Twenty-one thousand two hundred and twenty-four feet of logs were used in stringers and sills. These bridges have a width of 9 feet.

The width of road in excavation varies from a 5-foot to a 10-foot roadbed, the narrowest part being in Keystone Canyon.

The width of clearing and grubbing varies from 6 feet to 35 feet and averages about 25 feet. The narrowest part, viz, the 6-foot width, is in the advance 12 miles and was made only of sufficient width to permit the passage of pack-horses.

Comparative cost of construction, at prices common throughout the United States.

5,000 cubic yards solid rock, at $1	$5,000
7,000 cubic yards loose rock, at 40 cents	2,800
8,000 cubic yards pick-and-shovel work, at 25 cents	2,000
600 cubic yards retaining wall, at $3	1,800
120 cubic yards bridge cribs, at $2	240
856 feet (linear) bridging, at $3	2,568
5 miles rock ballast, at $150	750
200 acres clearing and grubbing, at $50	10,000
Total cost in United States	25,158
Actual cost of construction, as per report of Quartermaster-Sergeant Philip Glesener	

The average of this class of work along the coast region of Alaska is about 75 per cent greater than in the United States. Common laborers on the White Pass and Yukon Railroad receive $3.50 per day.

Along the Yukon River the prices paid during the season of 1899 were: Common labor, 65 cents per hour; skilled labor, $10 per day; foreman of party, $15 per day.

PHOTOGRAPHIC REPORT.

In order to obtain a complete and continuous pictorial record of the work of the expedition, and, together with the maps made during the season, to illustrate the topographical features of the region traversed by the United States military road from Port Valdez to Eagle City, I was authorized by the Assistant Secretary of War to take supervisory charge of the photographic work. The camera employed in my work was a 5 by 7 "Universal." The dry plates used were the most positive on the market. The printing paper used was that that would not be affected by dampness. A small board shack 7 by 8 feet was utilized as a dark room and for the storage of the photographic material. Picture making for the expedition was begun with the loading of the supplies and the stock on the steamer *Excelsior*, at Seattle, April 14, 1899, and was continued until the return of the expedition. In all some four hundred negatives were taken by myself and others. The want of a suitable movable dark room and the consequent delay in the development of negatives is the cause of the utter worthlessness of many valuable views made by the location party, far in advance of the main camp.

It is said that a good photographic view of Mounts Drum, Tillman, Wrangell, and Blackburn has never been made. I saw these mountains under remarkable conditions of the atmosphere and climbed to a height of 5,500 feet to obtain an unobstructed view, and made five exposures. On another occasion I made six exposures from a different point. They are all utter failures. According to all traditions of photography, they would be well-nigh perfect were it not for an unavoidable delay of six weeks in their development.

Photographs serve the purpose of illustrating in a general way the features of a landscape, but they come far from filling all the wants in that respect and can never compete with a hasty, yet skillful pen-and-ink or even pencil sketch. Perfect landscape photographs—that is, those that give to all objects the same degree of prominence that they represent to the eye in the actual view—can be obtained only by repeated trials and long waiting for favorable conditions of light and shade.

METEOROLOGICAL REPORT.

Upon the arrival of the expedition at Valdez, a rain gauge and maximum and minimum thermometers were adjusted and set up in suitable spots, and soldiers instructed in their use and the method of reading them. Shortly after the establishment of Station No. 2 another set of instruments were placed at that point.

The maximum thermometers were very frail and at both points these instruments were broken. A third set was on hand, which arrived with the thermometer broken, thus rendering the set valueless. Correspondence was at once opened with the United States Weather Bureau and application made for new and perfect instruments. The request was refused. Consequently the temperature records are of but little value.

The tables following give the monthly summaries of the records at Port Valdez and at Station No. 2. The weather conditions at Valdez are largely local ones. A comparison of the rainfall records of the two stations shows interesting differences. The diminution in the rainfall from the coast through the coast range of mountains to the Copper River Valley is gradual. At Valdez it rains the greater part of the time. There is less rain at Station 2, in Dutch Flat. Only 4 miles from Station 2, there is much less than at the station, and so on to Copper Center, where rain is rare. The same is true in regard to the winter months.

Meteorological Record.

MONTHLY SUMMARIES FOR PORT VALDEZ.

Month.	Temperature.					Precipitation.			Number of days.			
	Mean maximum.	Mean minimum.	Mean.	Maximum.	Minimum.	Total inches.	Greatest in 24 hours.	Total snow.	With 0.01 inch or more rain.	Clear.	Partly cloudy.	Cloudy.
May	52.74	33.41	43.07	64.00	27.00	2.88	0.45	Slight.	14	7	7	17
June	57.16	41.93	49.54	74.00	34.00	3.11	0.50	0.00	14	7	12	11
July	.....	46.87	.....	.....	30.00	2.75	1.08	0.00	9	19	1	11
August	.....	41.83	.....	.....	31.00	4.19	0.73	0.00	19	10	8	13
September	.....	34.66	.....	.....	15.00	8.71	1.24	0.00	20	7	4	19
October a	.....	25.00	.....	.....	15.00	4.52	1.70	28.70	10	9	6	12

MONTHLY SUMMARIES FOR STATION NO. 2.

May b	53.76	34.26	44.01	65.96	27.10	.....	.....	.....	.....	.....	.....	.....
June	59.03	42.43	50.73	74.90	33.01	1.66	0.24	0.00	15	13	2	15
July	69.06	49.19	59.13	86.90	42.10	2.21	0.55	0.00	10	19	4	8
August	61.25	44.67	52.96	73.00	37.00	3.07	0.53	0.00	13	13	4	14
September	59.30	37.83	48.56	74.00	29.00	5.46	0.58	0.00	19	10	00	20
October c	.....	30.07	.....	.....	18.00	1.26	0.85	3.00	6	11	1	14

a Record closes October 27, 1899. b Rain gauge not set up till May 26, 1899. c Record closes October 26, 1899.

TRAILS AND ROUTES.

By OSCAR ROHN.

The key to the Copper River country and to its future development was the discovery of the Lowe River passes and the construction of the military road from Port Valdez to the interior. It is true that the natives have for centuries reached the coast by way of Copper River, and that hordes of prospectors in the season of 1898 reached the interior in part by this route, but mostly by way of the Valdez Glacier, the only other route then known. But either of these routes is so difficult, dangerous, and impracticable for general travel as to be prohibitive to a thorough investigation and development of the mineral resources of the area. The discovery and improvement of the new route not only makes possible the shortest, easiest, and most direct connection between the Yukon district and the only good American port on the Alaskan coast, but it makes possible an investigation and development of the vast mineral resources of which the Wrangell Mountains and their eastern continuations give promise. The trail has been completed over the difficult and questionable part of the route. By way of it the prospector can now reach Copper Center with a pack-train load of goods in the same time that it would take him formerly to make his way with a light load to Copper Center from Valdez, while the transportation of his goods involved months of labor with sleds (133), over a route necessitating in places the use of rope and tackle. The new route, furthermore, for the first time, makes feasible railroad connection between a good port on the southern coast of Alaska and the interior.

The rush of gold seekers in 1898 was almost exclusively along the route from Valdez over the glacier down the Klutena River to Copper Center, and from here up the Copper River, mostly heading for the Mentasta Pass. As a consequence, a very good trail now exists between the foot of the Klutena Glacier and Copper Center. From here two trails lead to Mentasta Pass—one up the westerly bank of Copper River, for the most part along the top of the bluff, and the other in a more or less right line direction from Copper Center to the mouth of the Slahna, along the foot of Mount Drum. The latter was built by a party of prospectors, led by B. F. Millard, after whom the trail has been named. Both of these trails are said to be good, the former being the firmer and furnishing the best footing; but it involves crossing the western branches of Copper River, two of which, the Chestochena and the Tazlena, are considerable streams, and during the flooding season are difficult to cross.

The discovery of prospects on Quartz Creek and the Tiekell resulted in the development

of a trail from the point known as "The Rapids," on the Klutena River, to the foot of Tonsena Lake by way of Grayling Creek, and from there up Quartz Creek over what is known as "The Drop" to the Tiekell, about 4 miles above the mouth of Bowlder Creek. The new route avoids this divide, and reaches the Tonsena Valley, 12 to 15 miles below Tonsena Lake, by way of the pass at the head of the Kanata. From here an old Indian trail leads, in a general way, along the northern side of Tonsena River, reaching Copper about 8 miles above the mouth of the Tonsena. This trail was carefully marked, and can be easily followed. It will undoubtedly prove a part of the future route from Valdez to the Chettyna River. From the point where this trail reaches the edge of Copper River gorge, a connection was made with an old Indian trail leading down the westerly side of the Copper to the mouth of the Tonsena, on level ground along the top of the bluffs.

The trail from Copper Center down Copper River along the westerly bank is very difficult to follow, and leading up and down the bluff, it is most difficult to travel.

A trail is reported to run along the easterly side of Copper River, but no such trail was found. A trail along the easterly side of Copper River exists for the greater part of the distance between the mouth of the Tonsena and the Chettyna. This is very good in places, particularly near the Indian houses, and in others it is at times almost impassable.

From Indian Bellum's house, about 6 miles below the mouth of the Tonsena River on the easterly side of the Copper, a good trail leads in a direct line to the point where the Kotsena River emerges from the mountains, and from here follows the northerly side of the river for a distance of about 10 miles.

From a point opposite Bellum's a trail leads in a westerly direction across the mountains to the Kanata. This, however, is a mountainous route, and, while shorter, it is more difficult than the one by way of Tonsena River.

The general route up the Chettyna River is the Nicolai trail, leading from Taral over the mountains on the southerly side of the river to the Nicolai house on the Nezena. This is the trail followed by Lieutenant Allen in 1885. An old Indian trail was found on the northerly side of the river, leaving the bank about 8 miles above its mouth and running from here to the point where the Kuskulana River emerges from the mountains; then, following the Kuskulana, it crosses it near the foot of the glacier and leads in an easterly direction to the bend of the Lachena. Over this route we made several trips with horses. It is well marked up and can be traveled at almost any time of the year. From the Lachena eastward to the Nezena we cut a trail, over which we succeeded in taking our pack train; but it is probable that, with a little more work, a better trail could be made down the Lachena for a distance of 5 or 6 miles, and then along the southerly side of the mountains to the west of the foot of Root's Glacier. From there the route we followed is probably the best that can be found to the Upper Nezena during high water. It, however, involves very rough traveling. During low water, when the Nezena can be crossed, a better route would lead along the southerly side of the mountains to the west of it.

It was reported that the Indians formerly reached the coast at a point between Yakutat and Kyak by traveling up the southern branch of the Chettyna, known by the natives as the Tana. This route involves crossing a great glacier, and is no longer used by the natives.

The trail to the White River used by the natives and followed by Lieutenant Schwatka and Dr. Hayes, known as the Scholai Pass, leaves the Nezena at a point some distance above the foot of the Nezena Glacier, where a valley, free from glaciation, enters from the east. From the head of this a low gap leads to the head waters of White River, over the foot of what has been called Russell Glacier, which the natives claim to cross in half a day. In the winter time the natives travel along down the Scholai Creek, but in the summer time they use the trail through the mountains leading from the head of this to the Chettystone, an eastern branch of the Nezena, by which they reach the Nicolai house. This route is probably the only one feasible for crossing the Chettyna to the White or to the Tanana. It is said to be not very difficult for traveling, but I think it is impossible as a route for a railroad or pack trail, or for transporting

goods by any other means. The route by which we crossed the Tanana over the Nezena Glacier and Meiklejohn Pass is not practicable. Indeed, it is impracticable to attempt to cross from the Tanana and White to the Chettyna, or vice versa, except under pressure, with merely the provision and bedding necessary for the trip. It is feasible to reach the Upper Chettyna Valley by railroad, but it is impossible to continue from here across the range in any direction.

Mount Wrangell is reached from Copper Center by way of the Chestochena River, which route can be readily traveled during the winter or during the low season, but it is difficult during high water. Mount Drum is reached by a fair trail from Copper Center. A prospector's trail leads westward from the Copper River trail along the Tazlena to the interior, and from a point below the mouth of the Gulkana River an Indian trail leads some distance to the interior. Placer prospects on the Chestochena have led to the construction of a good trail along its westerly bank for a distance of some 70 miles. The trail to the Mentasta Pass along the Slahna River is now so well marked that it can be followed without difficulty. From the mouth of the Slahna a good trail leads along the easterly side of Copper River to Batzulnetas, a distance of about 10 miles, and from here a good trail leads to Lake Suslota and to the Suslota Pass. A trail from a convenient point on the Millard trail leading directly to Batzulnetas would save considerable distance over the route now existing by way of the mouth of the Slahna.

From Batzulnetas a good trail leads about 10 miles in a southeasterly direction. It there forks into three branches, leading by three different passes to the Nabesna River. They are all feasible for horse trails, and each is advantageous according to the point on the Nabesna River that is to be reached. The westerly one, by way of Lake Tanana, was used by prospecting parties traveling with pack trains during the past season, and the central one was used as a sledding route during the past winter. The easterly one, however, is the most practicable and the easiest, particularly for reaching the foot of the trail leading from the Nabesna to the head of the Tanana and the White. The trail traveled by the pack train is well marked up, but the others are difficult to follow, and require the aid of guides.

The trail from the Nabesna to the Tanana leads through one of two passes. The northerly one, the most direct and that used by the natives, is not feasible for pack horses, while the one to the south is. This is the only part of the route which offers any difficulty whatever for pack train or railroading, but the difficulties are not such that they can not be readily overcome. From here on to the head of the White River the country is merely hilly and offers no difficulty to the construction of either pack route or railroad.

CARTOGRAPHY.

The difficulty of transporting provisions through unknown territory and ignorance of the conditions and obstacles to be met usually demand of the explorer that he make progress the consideration of prime importance and that he restrict cartographic and scientific work to such as can be done without interfering with progress. In traveling through an unknown wilderness with a pack train, the progress of the party naturally depended on the speed I made in seeking and preparing a trail feasible for horses, and in undertaking to do both the cartographic and the scientific work of the expedition it was plain that the methods I used must give results with a minimum expenditure of time. I chose the ordinary plane-table method as particularly advantageous under these conditions. Equipped with a telescopic alidade, it was my intention to run a stadia traverse up the bars of the Chettyna, and using this as a base to carry the line of elevations from peak to peak by means of vertical angles. When time and conditions prevented the use of these methods, a traverse line based upon distance, by pacing or estimation and altitude, by an aneroid barometer could be substituted therefor and used under almost any conditions.

When the work must be based upon estimation, the checks and counter-checks afforded by intersections on the plane table very much improve the accuracy of such work. A valuable check for work of every kind, and an almost indispensable one for rapid work, consists in the location of points by the astronomic determination of latitude and longitude. For this purpose

I proposed using a 6-inch sextant with artificial horizon and two high-grade watches, which were to be compared before and after the trip with a standard chronometer left at Valdez. Unfortunately, but one watch arrived before I left, and that too late for a careful comparison with the chronometer. It was therefore necessary to abandon an effort to determine longitude and depend for a check solely upon latitude determinations. With the instruments named, an aneroid barometer, a prismatic compass, a powerful field glass, and an Eastman folding kodak, completed the instrumental outfit.

Under the impression that a trail suitable for horses had been cut through from Valdez to Copper River, I attempted to run a stadia traverse line over this route. Finding that the trail needed my almost constant attention, I was obliged to abandon the stadia work and to depend for a map of the route traveled upon such plane-table stations as I could make, and upon estimation of the distance between them. I was unfortunate in the selection of stations and succeeded in making a sketch map of the route traveled, containing an amount of information entirely out of proportion to the time required to make it. The work in the Tonsena Valley was confined to almost a single station. That, however, was on a high bluff and gave me an opportunity to see the entire valley.

The Copper River between Copper Center and the mouth of the Chettyna having been carefully mapped by the Schrader expedition last year, I made no effort to do any work on this part of it. The work up the Kotsena was based on pacing and estimation, comparing the map thus made with others based on actual measurements, showing the distance to have been overestimated in a proportion of about 6 to 5. Reducing the sheet by about this proportion makes it fit the rest of the map. The country to be mapped was found to be so mountainous and the mountains so complicated that an effort to represent the topography by contour lines would have consumed more time than could possibly be given to the work. I therefore attempted to represent it as nearly as possible by the use of hachures. This system was continued throughout the season on the field sheets.

High water in the Chettyna prevented the running of a stadia line along the bars. I succeeded in making a fairly accurate measurement of the distance between two bluffs a little over 3 miles apart, and from these I attempted to make locations by which to establish a system of triangulation, but very strong local attractions so disturbed the needle of the plane-table compass, that it was impossible to get satisfactory results. I combined this work with estimation and triangulation, and in this way carried the survey to the pass between the Lachena River and Roots Glacier. Here time permitted the measurement of a short base and the inauguration of a new system of triangulation, which was found to check very well with the work to that point.

At about this time the rainy season set in and the peaks were almost constantly obscured by clouds and fogs. This condition interfered so much with the work that I was unable to carry the system of triangulation here inaugurated through to the Nezena. I was able to run a stadia line from the point where we reached it opposite the upper forks to the foot of the glacier. This placed the work on the Nezena sheet on a measured base. The work thus far checked beautifully, considering the manner in which I was obliged to carry it on. It was impossible to carry the triangulation over the summit of the glacier, and from the summit to Copper Center the entire work was based upon the estimation of distance. By carefully checking this by plane-table intersections, I managed to keep the scale very uniform, and by astronomic determinations of latitude it was found the scale I had adopted was a trifle large. Reducing it according to the data furnished by these determinations makes this part of the work check very fairly with that south of the glacier.

The map of the Copper River from the Slahna to Copper Center is based upon a sketch made in a boat while running down the stream, and an estimation of distances from point to point made by McNeer during repeated trips back and forth while sledding goods on the ice last winter; and the reduction of this sketch to the points at the mouth of the Chestochena and at Copper Center, which were located by latitude determinations. The Chestochena was traversed from its mouth to the log cabin, a distance of about 25 miles, and this checked by latitude determinations at its mouth and at the log cabin. A sketch of the river beyond this point, based

upon the recollection of McNeer, who headed the stream last year, was not transferred to the general map because this area, I understand, was covered by Griffith, a topographer, with Captain Glenn's party.

The latitude of Copper Center, determined by observations on two different days, gives results of 61° 55.2′ and 61° 55.9′, checking, therefore, within 0.7′; while the map of last year's expedition makes it about 62° 08′. The latitude of the mouth of the Chettyna was found to be 62° 30′, checking within 2′ of the latitude given by last year's expedition. For the part of the map surrounding the head waters of the Nabesna River I am indebted to a native known as Tanana Nicholas, whose very able sketch of the area I adapted to such features as I have been able to locate.

Acting on the principle that any information is better than none at all, I attempted to locate as accurately as conditions would permit, not only the route which we traveled and the features adjacent to it, but also the area on both sides of the route as far as I could see it. By making my plane-table stations as far as possible on mountain tops, I was able to cover a wide area. Under these conditions it must be understood that, while the features adjacent to the route may be depended upon as accurate within the limits of the methods used, others must be generalized, and inaccurate in detail, as they were more and more remote from the point of observation. This is particularly true of the area east of Mount Wrangell, at the head of the Nabesna River, which, as has been said, is based upon information gotten from the natives; and, while it may be very inaccurate in detail, represents the best information regarding this area obtainable at this time, and I trust will prove of value to those interested in its development.

FROM VALDEZ TO EAGLE CITY.

By Quartermaster's Clerk JOHN P. RICE.

The expedition started on its mission the afternoon of June 16, 1899. Its personnel consisted of Edwin Wood, packer; Edwin Cashman, cook, and John Weiler, hunter. We took with us 5 pack and 2 saddle horses and the necessary rations for thirty-five days.

Post-Office Inspector C. L. Wayland accompanied the expedition for the purpose of establishing post-offices at the several mining camps along the line of travel.

Our course was up Lowe River to Keystone Canyon, which we reached the same day, after a journey of 16 miles. At this point we remained three days, awaiting the completion of the trail which runs through the canyon into Dutch Valley. In the matter of picturesque scenery the Keystone Canyon is one of the finest in Alaska.

We passed through the canyon and down the Dutch Valley June 19. We left Dutch Valley the following day and crossed into the Tiekell Valley. Here we met several prospectors with pack trains en route to the Chettyna country. We followed Tiekell Valley in a northeasterly direction, until we crossed the South Fork of the Tiekell River, and thence followed up the North Fork of the Tiekell until we reached Stewart Creek, a small stream flowing into the Tiekell. The scenery of the valley, as viewed from the divide, is impressive. The moss-covered mountains tower hundreds of feet above one on either side, while the perspective, as the eye sweeps the valley, is enchanting. We crossed Stewart Creek near its mouth. After several miles of travel we passed what was known at one time as Tiekell City, it having been destroyed by fire some few years before our arrival. Here we crossed another divide without much difficulty and proceeded to the headwaters of Quartz Creek, which we followed down until we reached Belcaro, situated at the junction of Bear Creek. At the last-named place we found about 50 miners, who were long on prospects and short on gold. From what could be learned, the only way mining could be made to pay at this point was by the use of hydraulic machinery.

Leaving Quartz Creek, we crossed another divide, which led the expedition to Tonsena Lake. This lake is a magnificent body of water, mainly fed by glacier streams and the melting snow from the mountains. It is about 8 miles in length and about 2½ miles in width. Salmon, pick-

erel, bass, and perch abound in these waters, and a variety of small and large game may be found throughout the surrounding mountains. The timber through which we passed up to this time was exceptionally heavy and the grazing fairly good.

The Tonsena River finds its source in the lake of that name and empties into the Copper. I employed a prospector who was camped here to take the men and outfit across the river. After crossing the Tonsena River, we proceeded up Manker Creek until we reached a low divide on which are located two small lakes. From these two bodies of water flow two small streams, one of which, called the Grayling, flows north and empties into the Klutena River, above the rapids; the other, the Manker, flows south and empties into the Tonsena Lake. From the low divide we proceeded down Grayling Creek until we reached Rapids City, a town located on the Klutena River, about 85 miles from Port Valdez.

In the fall of 1897 and the spring of 1898 quite a number of prospectors became stalled at this place, owing to the rapids in the river. They erected cabins and made this point their headquarters. Scurvy and poor prospects for finding gold caused them to abandon the town. When we reached the place the only inhabitant was Private Garrett. The latter was in charge of military stores and incidentally operated a ferry across the Klutena. The horses were made to swim the river, while the men and impedimenta were ferried across by Garrett. We were now practically across the coast range, which, in the past, had been looked upon as a most insuperable obstacle by previous explorers. Our course henceforth was along the Klutena River until we reached Copper Center, which is situated some 25 miles from Rapids City. Copper Center is located at the confluence of the Klutena and Copper rivers. The town at one time contained about 600 inhabitants. It became depopulated from natural causes and only a few prospectors remain.

Privates Hallett and Kendricks were found stationed here in charge of military stores. It was now fourteen days since our departure from Valdez and we had traveled about 110 miles. While here I concluded to replenish our stores, as we were running short on several articles.

A camp of about 30 Indians was found at Copper Center. They had located at this point in order to catch their winter's supply of fish. They had evidently met with good luck, for on the banks of the river we found several hundred pounds of freshly caught salmon. I employed two of the Indians as guides to place us safely on what is known as the Millard Trail. We proceeded on our journey July 1, after crossing the Copper River. This stream has always been considered a dangerous one to cross, owing to its many rapids and the swiftness of its current. However, we met with no accidents. The trail, being plainly marked, was not difficult to follow. We passed over it to the Sanford River. The country traveled over has the appearance of an excellent one for agricultural purposes. The terraine is rolling and free of brush and trees.

The Sanford, at the time we forded it, was exceptionally low. It has its source in the glaciers of Mounts Sanford and Drum. At certain periods of the year it is swollen to such a size as to make it an exceedingly dangerous stream to cross. After crossing the Sanford we lost all trace of the trail. Our course thenceforth was along the foothills of Mounts Sanford and Drum, until we could see in the distance the mouth of the Slahna. Here we left the foothills, passed through the valley, and recrossed the Copper. It being very low, it was forded without trouble. We then proceeded in the direction of the Slahna, arriving about 8 miles above its mouth July 8. Here we were compelled to build a raft in order to get the men and outfit across. Our course was now up the west bank of the Slahna. The timber along the bank of the Slahna is exceptionally heavy, consisting chiefly of spruce, birch, and cottonwood. We traveled along the ridge until we could see Lake Mentasta in the distance. After recrossing the Slahna and following an old Indian trail, we arrived at Mentasta Creek. Here we found several deserted Indian shacks, as well as their paraphernalia for catching salmon. Fording this creek, we continued along the trail until we reached Mentasta Lake, which is located at the foot of Mentasta Pass. It is a very pretty body of water and the scenery about it is rugged and impressive. Above its waters tower the mighty spurs of the Alaskan range. The fishing and hunting in this region is not surpassed in any other portion of Alaska.

At this place we found camped some 20 prospectors and 3 of the Tetling Indians. From these latter we learned that all but 2 of the Mentasta Indians had died the previous winter

and that the 2 survivors had joined the Ketchumstock tribe. They were here to verify the report and, if true, to ascertain what the prospects were to obtain a winter's supply of fish. I noticed that they were heavily armed, and on making inquiry learned that they had no right in this section of the country and were prepared to defend themselves if necessary. The prospectors showed me some very fine specimens of rock, which they expected to send to the States to be assayed.

We left the lake July 12 and proceeded through Mentasta Pass. This pass is extremely low and narrow and in passing through it we could scarcely realize, but for the mountains towering above us, that we were traveling through the Alaskan range. Once through this pass we soon reached the Little Tok, which was easily forded, and proceeded to the Big Tok. Arriving there, we were again compelled to build a raft to get our outfit across. In the valleys between the two rivers we encountered some of the heaviest timber we had yet seen on our travels. Some of the spruce and fir trees were over 2 feet in diameter and 90 to 100 feet in height.

The Tanana was reached July 16, after traveling some 25 miles of the levelest, as well as the dryest, country in Alaska. Fortunately I had been informed by the Indians at Mentasta Lake that we would be unable to obtain water after leaving a small lake on the other side of the Big Tok, and I arranged to make the trip between these two points in one day.

We again built a raft, and after several ineffectual attempts and a delay of two days the Tanana was safely crossed. The river at this point is some 500 feet wide and runs at an extremely rapid rate of speed. From here we proceeded to Lake Mansfield, arriving there July 18. This lake is a beautiful body of water, of the darkest blue, and is inhabited by almost every variety of fish. Vegetation in the vicinity of the lake is of the rankest kind.

Here we found camped a band of about 50 Ketchumstock Indians, consisting of men, women, and children. They spend the summer hunting and fishing in this locality, and in the fall return to their winter quarters at Ketchumstock Village. They were very inquisitive, and among other questions, asked if we were McKinley men and when the railroad (which was expected to run through that section) would be completed. The Ketchumstock Indian is superior intellectually, physically, and morally to the Copper River Indian. He is very hospitable as well as honest, and a cache left in his charge is safer than when left with some white men. He is very fond of tobacco, sugar, and tea, and prefers these commodities to money. The women and children, as well as the men, chew and smoke. Like all other Indians, they are subject to lung and other hereditary diseases, and consumption is carrying them off rapidly.

Leaving the lake, we crossed a divide and descended into Mosquito Valley, through which runs a creek of that name. Mosquito Creek is a tributary of Forty Mile River. The valley is very properly named. Millions of mosquitos, gnats, and other pestiferous insects find a habitation here. The surface of the country is low and the growth of grass something extraordinary. The valley is about 25 miles wide and 50 miles long. It is sparsely timbered, except along the bank of the creek. Judging from the character of the soil, nearly everything grown in the States, with the exception of fruit, will grow here. As we advanced up the valley our route was along a corral some several miles in length and constructed similar to our rail fences. Into this huge pen of thousands of acres the Indians drive the caribou and moose. As the animals emerge from the pen through these openings, the Indians lasso them and cut their throats. They hunt in this manner, because it is the surest as well as the cheapest way. All of them can take part in the hunt without scaring the animals as do firearms; again, it is a great saving of ammunition, which is very scarce in that part of the country.

Ketchumstock Village, the home of the Ketchumstock Indians, was reached July 21. We had now traveled a distance of 321 miles since our departure from Valdez. When we arrived at Ketchumstock our guide refused to proceed farther with us, as the law of trespassing on the territory of other tribes is rigidly enforced, the penalty being the death of the invader if caught, unless he shows a permit from the chief of the country to travel through it. After a great deal of coaxing and promising to bring him tobacco, he finally consented to accompany us to Franklin Gulch.

Leaving Ketchumstock, we proceed to Franklin Gulch. Our course was over the Ketchumstock Hills to the head of the gulch and down the gulch until we reached the mouth. Strung along the gulch are the cabins of the miners, who are still searching for gold. Franklin Gulch is one of the oldest mining camps in Alaska. At one time finds there were rich and numerous. But little of the precious metal is now found, as the mines have been nearly exhausted.

While at the gulch we were informed that all of the claims had been bonded to a New York syndicate, and that in the near future improved processes in mining would be inaugurated. Thus far, Franklin Gulch was the first locality we struck where mining was in actual progress. While there specimens of gold nuggets were shown us, ranging in value from $5 to $75, all of which had from time to time been taken from the gulch. The possessors of these nuggets took great pride in exhibiting them and in relating stories of their early days in the gulch.

Our objective point was now Eagle City, on the Yukon. Upon making diligent inquiry, we could find no one who could positively locate the town. As it was necessary for us to proceed on our journey, I employed a guide who pretended to know the country over which we were to travel. Some of our provisions were now growing scarce and, being unable to purchase any from the miners, we finally borrowed what we needed to carry us through, promising to return the same in kind on our way back. At the mouth of the gulch we crossed the South Fork of Forty Mile River and from thence proceeded by way of Forty Mile trail until we reached the head of Steele Creek. Our course was now down Steele Creek to its mouth, which, when reached, we crossed Forty Mile River proper. Once across the river we again took up the Forty Mile trail, which runs along the ridge, and followed it until we reached the "Dome," a peak domelike in contour and about 8,000 feet high.

At this point we left the Forty Mile trail and proceeded due north, crossing a tributary of O'Brien Creek near its source. We again reached the ridge, and after traveling along it for a few miles the waters of the mighty Yukon burst upon our vision. Continuing along the ridge, we caught sight of an island. Thinking it might be Belle Isle (the former name of Eagle), we passed down the ridge to the headwaters of a stream, which we supposed was American Creek. As a matter of fact, we found it was Boundary Creek—a stream which marks the boundary between Alaska and the Northwest Territory. We followed this creek to its confluence with the Yukon, reaching that point on July 27.

Upon our arrival at the Yukon we found, to our great disappointment, no town in sight. Fortunately, however, we found two prospectors rowing down the river. Upon questioning them they informed us that we were some 12 miles east of our destination. Post-Office Inspector Wayland joined the prospectors here and proceeded to Eagle City. The next morning we also started for Eagle City, reaching that point without incident on July 28, after an absence of forty days, and traveling a distance of some 425 miles.

Considering the character of the country through which we passed, the condition of the men and horses was fairly good. On account of being compelled to walk most of the way, the men were somewhat footsore. On reaching Eagle City I reported to Captain Richardson, commander of the military post at that point.

Major Ray and his command arrived some three days later for the purpose of superseding Captain Richardson. I remained at Eagle City eleven days before commencing my return journey to Port Valdez, spending the intervening time in replenishing our supplies, resting my men and horses, and having the latter properly shod.

A few words about Eagle City may prove interesting. The town appears to be in a flourishing condition. It is located above the mouth of Mission Creek at a height sufficient to prevent its being damaged by the overflow of the Yukon. It has a population of about 700. Most of the dwellings are constructed of logs. The Alaska Commercial Company, the North American Transportation Company, and the Alaskan Exploration Company have general supply stores at Eagle City. There is also a sawmill with a capacity for turning out several thousand feet of lumber per day. In addition to the above, the town is well supplied with retail stores, restaurants, and saloons. There was no church at the time of our visit. The gospel was being

expounded in a saloon. I found the town to be exceptionally quiet. I saw no gaming or dance halls in operation and no immoral characters parading the streets, such as are seen in most mining camps.

Having thoroughly recruited the men and horses and being fairly well provisioned, we started on our return journey to Valdez August 9, over practically the same route that we had traveled before. Instead of returning by way of Boundary Creek, however, we followed the trail that leads up American Creek. We then took the ridge, traveling along it until we reached the "Dome." From this point onward we traversed the identical route over which we had hitherto traveled. We carefully reblazed the trail as we went along, in order that those who passed over it after us would have no difficulty in pursuing their way.

Between the "Dome" and Forty Mile River we encountered a pack train from Forty Mile Post packing provisions to Jack Wade Creek. The latter is a stream which runs into the South Fork of Forty Mile, and whose course is parallel to Napoleon Creek. Here we were informed that a rich strike had been made on the creek, and that out of a wheelbarrow of dirt upward of $800 of gold had been panned, the gold assaying $18.40 per ounce. It was estimated at the date mentioned that there were some 700 prospectors located on the creek. In the pack train was a horse that had wintered in the vicinity of Lake Mentasta, and had been picked up by a prospector and taken down to the post. This would seem to demonstrate that stock can be successfully wintered in the interior.

Captain Glenn's expedition was met midway between Steele Creek and Franklin Gulch, en route to Eagle City. At the headquarters of Mosquito Creek, between Ketchumstock and Mansfield Lake, we met Mail Contractor Holman with his pack train, establishing mail stations along the trail, as well as leaving supplies at the several stations to enable him to successfully carry on his operations the coming winter.

Between Slahna and Sanford rivers we encountered a herd of caribou. While they were inspecting our outfit Wood fired several shots at them, but without effect. It was near this same spot, while on our way to Eagle City, that Wood was treed by an enormous brown bear. Hearing footsteps in his rear, he turned and discovered the bear making for him at a slow pace. Wood sprinted for his life to the nearest tree and swung himself by a handy limb to a place of safety. We heard his cries for help and frightened the bear away by firing our guns. On September 2 we arrived at Copper Center. Here we met Surveyor Powell, of the expedition, who was running a line from that point to Mentasta Lake. We remained here one day, recruiting men and horses. At 2 p. m., September 3, while standing on a stump making observations, I was violently precipitated to the ground by a sudden seismical disturbance. The trees swayed to and fro as if a hurricane was raging. In the midst of the convulsion of nature there was borne to our ears sounds resembling the discharge of heavy artillery. Some 15 miles distant we could see Mount Wrangell emitting smoke and lava. The scene was one of terror, as we expected every minute to see the earth open.

On September 4 we proceeded on our journey to Valdez, reaching Klutena Rapids the same day. Upon our arrival at the North Fork of the Tiekell River, we found Captain Abercrombie's pack train. We reached Port Valdez at 2 p. m., September 11. The trail for the last 60 miles of our journey was in excellent condition.

The route over which we traveled from Port Valdez to Eagle City presents no such obstacles as did the route through the Cascade or Rocky mountains. The pack trail now constructed through the coast range by Captain Abercrombie could be transformed into a wagon or a railroad bed. No glaciers are to be encountered, nor any other serious obstacles. The most difficult part of the trail, which is through the coast range, is now practically completed. There are no other mountains until the Alaskan range is reached, some 150 miles north of the coast range. As there is a pass through this range, no difficulties whatever are encountered. As far as the Ketchumstock hills are concerned, they also present no obstacles that can not be easily overcome by competent engineers.

TRANSALASKAN ROUTE.

The all-American route is some 200 miles shorter than either the Skagway or White Pass, Dyea or Chilkoot routes. It is the only route that can be traveled from the coast to the Yukon without being compelled to make a long and tortuous passage by boat. By taking this route no disagreeable transfers, such as are found on the other routes to the Yukon, are necessary. It will be found the cheapest and most feasible route to take stock into the region of the Yukon, being accessible to Dawson, Forty Mile Post, Fort Cudahy, Eagle, and Circle Cities, as well as to the different mining camps in the Forty Mile country. There is an abundance of grass, as well as water, along the route, for stock, from May to October. Stock can be grazed along the way as far as the Mosquito Valley, and it can there be left to be drawn upon from time to time as occasion demands.

There is an excellent opportunity for enterprising and adventurous persons to make money by shipping stock to Valdez and then driving the animals through to the Yukon. Cattle could be made to sustain themselves en route and, if carefully driven, should be in excellent condition when they arrive at their destination. The price of fresh-dressed beef in the Forty Mile and Yukon countries ranges from $1 to $1.50 per pound. On the foot cattle sell at 23 to 50 cents per pound.

FOOD RESOURCES.

The food resources of the interior of Alaska are not as meager as may be supposed. There are to be found the caribou, moose, brown and black bear, mountain goat, and several varieties of smaller game, such as the wild goose, the duck, the grouse, the fool hen, and ptarmigan. The rivers and lakes abound with choice varieties of fish, such as the king salmon, dog salmon, pickerel, perch, bass, whitefish, trout, pike, and grayling.

Of the smaller fruits, there are the cranberry, salmon berry, blueberry, alder berry, raspberry and wild currant, all of which grow in great profusion throughout the interior.

Small garden vegetables are successfully grown at Forty Mile Post and Eagle City. At this point I saw fine specimens of potatoes, cabbage, turnips, beets, radishes, carrots, and lettuce, all of which had been grown by the residents of the towns.

TIMBER.

The country throughout which we traveled is fairly well timbered. As you travel northward and reach a high altitude the timber line varies. The varieties of timber are the spruce, the fir, the birch, the cottonwood, and the alder and willow. The predominating varieties are the spruce and fir, which latter grow to enormous size. The spruce may be used for mining and railroad timber, as it averages from 12 to 16 inches in diameter and from 75 to 85 feet in height. The white birch predominates in the vicinity of the Slahna, and will average about 14 inches in diameter. Forest fires have destroyed thousands and thousands of acres of timber throughout the interior, especially in the last few years.

CLIMATE.

The climate in the interior of Alaska is milder and much dryer than it is on the coast. From June until September it resembles the climate of the northern portion of Minnesota and Wisconsin.

RIVERS.

The rivers along this route, with the exception of the Yukon, are exceedingly difficult to navigate, owing to the swiftness of the currents as well as their many rapids. All rivers south of the Forty Mile River are fed by glacier streams. They are usually muddy until late in the fall, when they begin to grow clear, owing to the fact that the glaciers have then ceased their flow.

AN EXPEDITION INTO THE MOUNT WRANGELL REGION.

By OSCAR ROHN.

The country about Valdez consists of a series of rugged saw-tooth ranges, with a general east and west axis, separated by narrow valleys. In traveling to the interior over the new route the first of these ranges is crossed through Keystone Canyon and the second by Thompson Pass, from Lowe River to the Chena River. The Chena River, rising to the east of the Valdez Glacier, flows first in a general southerly direction for a distance of some 8 or 10 miles, and then turns abruptly east into a deep, narrow, canyon-like valley, which it follows in the same general direction to the Copper River. Our route reached the Chena at the turn, and we then followed it for a distance of from 15 to 18 miles, to a point where it is joined by the Kanata. This stream enters by a valley transverse to those thus far crossed. The valley of the Kanata leads in a general northerly direction over a low divide into the valley of the Tonsena River, the southern border of which marks the northern limit of the coast ranges.

From the confluence of the Kanata and the Chena, the extremely jagged nature of the ranges, characteristic of much disturbed bedded rock, gives way to rather more regular forms, which northward become more and more rounded in outline. This is particularly true of the moderately high range separating the valley of the Tonsena from that of the Klutena, the regular well-rounded outlines of which indicate massive eruptives. The range between the Lowe River and the Chena River, while widening to the east, continues with the same general features between the Chena and the Tasuuna to Copper River. The area between the Chena and the Tonsena in one direction, and the Kanata and the Copper in the other, consists of an irregular group of rather uniformly high, close-nested peaks, standing on an elevation of perhaps 5,000 to 7,000 feet, and marked by no heavy or irregular drainage lines. This area can not be very rugged or difficult of access, as it is crossed by an old Indian trail from Copper River to the valley of the Kanata.

Westward of the Kanata is a heavy range which is separated from the range adjacent to the Valdez Glacier by the valley of the Upper Chena on the south and that of lake Tonsena on the north. This valley is cut by a high and difficult divide, separating the two valleys named. Northward from Tonsena River, and extending eastward to the Wrangell Mountains, is a great flat valley covered with an exceedingly heavy deposit of gravel and glacial silt, indicating, as has been suggested by Schrader and others, that it was at one time the bed of a great lake or arm of the sea. This valley extends north to the Mentasta range, which forms the divide between the Tanana and the Copper and the Sushitna. Through this valley the Copper River cuts a gorge through gravel banks, at places attaining a depth of 500 feet, and lateral streams enter it through corresponding gorges.

Washing out the finer material and leaving behind the heavy glacial bowlders makes the beds of these streams so full of large bowlders that they are always exceedingly dangerous, and often entirely unnavigable with boats. The bed of the Copper is, in places, notably between the Gulkana and the Tazlena, so full of heavy bowlders that at low water navigation by means of small boats is not lacking in excitement. These gorges add greatly not only to the difficulty of travel, but to that of trail building or railroading, or any similar enterprise in this area. The Copper River follows the eastern border of the mountains south of the Tonsena to Woods Canyon. Just above this it is joined to the east by a river of about equal volume, known as the Chettyna. The Chettyna follows the southern edge of a broad valley, which widens rapidly toward the west.

South of this valley is a group of mountains resembling in every way the group south of the Tonsena, of which it is the eastern extension. The Chettyna rises at a point about east from its mouth, in a glacier descending from the high range forming the northern extension of the Mount St. Elias Mountains. It is joined from the south by one important branch, called by the natives "Tana." This river rises far to the south in the coast range opposite the Bering Glacier. From the north the Chettyna receives a branch in volume almost equal to the other two, and known as the Nezena. This rises in a tremendous glacier in the range to the north separating the Chettyna from the Tanana. With its extremely high flood plain and heavy gravel bars the

Chettyna is a typical glacial stream. Its valley, as has been said, narrows toward the east to a point just below the mouth of the Nezena, and from here it again widens. The area between the Nezena and the Chettyna proper, or central branch, as it is called, is a flat plain, while the lower Chettyna flows between steep, high banks. The valley between it and the Blackburn Mountains to the north is composed of irregular rounded hillocks, with a general east and west axis, between which are innumerable lakes and peat bogs, typical of a glaciated surface.

Of the Wrangell group of mountains, lying to the north of the Chettyna, and between it and the Copper, the most central and most important feature is Mount Wrangell, a huge, smooth, slightly rounded dome, towering above all surrounding peaks. The surface of this is covered with a great thickness of ice, broken only by a small number of small conical fumaroles. To the north and northwest of Mount Wrangell are two very prominent peaks, known as Mounts Sanford and Drum, and to the southeast is a peak known as Mount Blackburn. The latter is a round mesa top, the remnant of a form once similar to that of Wrangell, but now deeply indented by erosion. Mounts Sanford and Drum have suffered even more from erosion, Mount Drum in particular presenting from the south a jagged and crater-like appearance. This, however, instead of being an actual crater, is probably an example of the amphitheater form of erosion, due to the local glaciation. From the north the appearance of Mount Sanford and Mount Drum is almost identical. A divide connects Mount Wrangell with Mount Drum, and another connects Mount Wrangell with Mount Sanford. The basin between the two gives rise to the Sanford River. Mount Drum is an isolated mountain, bordered on its northwestern side by the great flat valley of Copper River. To the southward a series of foothills front Mount Wrangell, and these widen toward Mount Blackburn.

The southern side of Mount Drum is drained by Knetena Creek, and the southern and western side of Mount Wrangell gives rise to the Chestochena. The area south of this, and immediately west of Mount Blackburn, is drained by the Kotsena. This stream, heading at Mount Blackburn and flowing in a westerly direction through a narrow, deep valley, turns abruptly at the point where it emerges from the mountain, and, following the foot of the mountain southward through a narrow canyon for some miles, again turns westward and empties into the Copper about a mile above the mouth of the Chettyna.

All of these streams are mountain torrents, and unfit for canoeing. Fronting Mount Blackburn to the south and west, for a distance of 15 to 20 miles, is a group of mountains or foothills of rather uniform elevation from 5,000 to 7,000 feet. The area southward from that drained by the Kotsena River is drained by the Kuskulana. This, like the Kotsena, heads in a glacier descending directly from Mount Blackburn. It flows in a southwesterly direction, emptying into the Chettyna about 10 miles above its mouth. The divide between Mount Blackburn and Mount Wrangell is uniformly high and impassable.

In a direction a little north of east from Mount Blackburn extends a range a little lower than Blackburn itself, terminating about 20 miles to the east in a prominent peak called Mount Regal. Beyond Regal the range is a little lower, and makes a horseshoe bend northward to another group of mountains surmounted by a prominent peak, almost in line with Blackburn and Mount Regal. This I have named Mount Abercrombie. In this northward bend are two passes occupied by the lobes of a great glacier, which gives rise to the Nezena on the one side and the Tanana on the other. The summits of these glaciers constitute the lowest points in the range, an elevation of over 8,000 feet. Mount Abercrombie is at the northern end of the northern extension of the great St. Elias range. The White River heads in the Russian Glacier, descending the northern side of this mountain. It is thus, seemingly, the highest point on the continental watershed, giving rise to the White, which flows northeast, the Tanana to the northwest, and the Chettyna, which flows toward the southwest. There is a comparatively low break between the head of White River and Scholai Creek, which leads into the Nezena. Russell Glacier, at the summit of this pass, can be crossed in half a day. The pass between the Nezena and the Tanana, which I have named Meiklejohn Pass, involved crossing a glacier 47 miles long with an 8,000-foot summit.

A high range extends a considerable distance eastward from Mount Abercrombie and forms

the southern border of the White River basin. To the north of the high range between the Tanana and the Chettyna is a valley about 10 miles wide, extending in a northwest-southeast direction. This is bounded on the north by a group of mountains which form the southern extension of the Mentasta range and the divide between the Copper and the Tanana rivers. Both the Tanana and the Nabesna cut this range through narrow gorges. The valley is crossed by a range of low hills forming the divide between the Tanana and the White, and to the westward it terminates in a narrow pass leading to the valley of the Nabesna, the great western branch of the Tanana, which drains the triangular area between Mounts Wrangell, Blackburn, and Regal; the area which has generally been considered the drainage basin of the Copper River.

The valley of this stream is separated from the valley of the Copper River by a range of mountains attaining a height of 5,000 to 6,000 feet, which extends in a northeasterly direction from Mounts Wrangell and Sanford, finally merging into the Mentasta Mountains. Mount Sanford is fronted to the northeast and east by a group of jagged mountains surmounted by several rather prominent peaks. Between these and the Mentasta range, and north of the Nebesna divide, is the head of the Copper River Valley, a rather flat area studded with innumerable lakes and bogs. Several lakes attaining considerable size are named by the natives Tanada, Zachnada, Totrachara, and Suslota.

Streams from these lakes drain into the Copper River. This river, about 6 miles above its confluence with the Slahna, divides into two forks of about equal volume. One of these flows in a northerly direction from the foothills of Mount Sanford, and the origin of the other is in a glacier farther to the southeast. Whether this breaks through the Nabesna range and flows from a glacier descending from Mount Wrangell or whether the glacier in which it heads descends from the easterly slope of Mount Sanford I was unable to determine, but it is probably the latter. The drainage basin of the head of the Copper River is, therefore, very much more limited then than was formerly supposed, and the area east of Wrangell Mountains that had formerly been considered as belonging to the Copper in reality belongs to the Tanana.

The Nabesna divide is cut by three easy passes, suitable alike for horse trail and railroad. The Nabesna-Tanana divide is crossed by a pass somewhat more difficult, but the Tanana-White divide is merely a range of hills. The area is, therefore, very accessible, and affords an easy route from the valley of the Copper to the valley of the Yukon. The Tuchsana Mountains, the easterly end of the Mentasta range, are jagged mountains, characteristic of highly inclined bedded rocks. North of their intersection by the valley of the Nabesna they become more regular. Back from the Copper River, between the Slahna and the Chestochena, is a range of low, rounded hills. In the direction of the head of the Chestochena very high, snow-capped peaks are seen. These are probably in the vicinity of Mount Kimball, in the range bordering on the Tanana Valley. In descending the Copper, after passing the Slahna River, which is a stream of considerable volume entering the Copper from the neighborhood of Mentasta Pass, the next stream of importance is the Chestochena. This is a swift stream of considerable volume rising in the Alaskan range in the neighborhood of Mount Kimball.

The area between the Chestochena and the Tazlena is drained by two small streams known as the Gakona and the Kulkana. From the southerly side the one important stream entering Copper River is the Sanford, which enters into the Copper about 15 miles below the Chestochina. The Copper River, from some miles above the mouth of the Slahna to a point some miles above the mouth of the Sanford, is very wide and spreads over what is, in connection with Alaskan streams, called snag flats. At the point named above the Sanford it gathers into a single channel and does not again spread very much, except for a few miles below the mouth of the Gulkana.

One of the most interesting features of the summer's work was our inability to find and locate the mountain mapped as Mount Tillman. In coming down the Copper River from the north Mount Wrangell is visible between Mounts Sanford and Drum at a point opposite the mouth of Sanford River. From here Mount Drum masks Mount Wrangell, but the latter again becomes visible at a point a few miles above the mouth of the Tazlena. On the day we came to the Copper River an eruption took place, which left no doubt whatever that this is Mount Wrangell. At Copper Center Mount Drum completely masks Mount Sanford, and from this

point the only mountains visible were Mount Drum, Mount Wrangell, and Mount Blackburn. In descending Copper River from Copper Center a mountain again becomes visible between Drum and Wrangell. Were it not for the fact that it is masked by Drum at Copper Center, this mountain might easily be considered south of Drum and between it and Wrangell. It is highly probable that in ascending Copper River Lieutenant Allen got only occasional glimpses of these several peaks, and that, owing to an error in observing bearings or to this deceptive position of Mount Sanford, he considered it a peak south of Mount Drum. Such an error might very readily be made. However, in view of the care with which we studied the position of these mountains in traveling from the Slahna to Tonsena Lake, and the great number of clear days, which enabled us to see them from all positions, I have little hesitation in saying that there are only four mountains, and that the location of Mount Tillman on the map is an error.

MINERAL RESOURCES.

COPPER.

The copper in the interior of Alaska has, this year, for the first time, attracted the attention of prospectors, and as a result of the season's work rich finds are reported on the Chettyna and Kotsena and on the headwaters of the Tanana and White rivers. How far these reports are reliable remains for future developments to show. Nicolai, the Copper River chief, who is responsible for most of the earlier reports of copper on the Chettyna, for the first time disclosed the location of the vein from which he secured the samples of ore which he displayed. This vein is located on a small creek emptying into McCarthy Creek and between it and the Nezena River. This is a true vein deposit in a fissure, probably due to faulting. The main body of the ore is bornite. It occurs in a dark green amygdaloidal diabase near the contact of the same with a heavy limestone bed. The diabase seems to be irregularly bedded and can be traced for miles in both directions. The persistence and uniformity with which the diabase is found associated with the limestone bed above it would tend to indicate that it is extrusive in origin, with the limestone conformably upon it. The limestone is the same as that noted by Dr. Hayes on the Nezena River, and which he referred to as the Carboniferous. (See maps and descriptions of routes of Explorations in Alaska in 1898; United States Government Survey, 1899, p. 58.) The diabases resemble to a very marked degree the Keweenawan copper-bearing rocks of Lake Superior. The contact between this limestone and the diabases and the different outcrop of the same from Roots Glacier to the eastern side of the Nezena River has been noted in the preceding section. In view of the fact that this deposit, probably the largest known in the area, is found in association with diabases similar to those which in other areas are known to carry large quantities of copper makes it probable that these diabases are the source of the copper in this area. The general strike of the outcrop makes it possible that the very similar diabases at the head of the Kotsena River belong to the same series. The heavy limestone bed, however, does not appear on the Kotsena.

None of the locations made at the head of the Tanana or the White were visited, but fragments of rock heavily copper-stained and impregnated with native copper were found in several places, particularly in the pass from the Tanana to the Nabesna rivers. Here the rock seemed to be a later volcanic which, as in the Nicolai location, was much fractured, faulted, and associated with adimentary rock. The Indians on the Nabesna had bullets, knives, and arrow points made of native copper. They explained that they got these at four different places, one on a tributary of the White River, probably the one which Dr. Hayes visited, and which he found to be a copper placer. The others were farther west on the headwaters of the Tanana and the Nabesna. Whether these were also placer deposits could not be determined. The frequent copper stains on the rocks and the many different points at which copper has been found leave little doubt that there is copper disseminated through some formation in the area. But whether this exists anywhere in workable quantities remains to be proven.

At the head of the Kotsena and in the area about Mount Wrangell diabase dikes frequently carry a very large quantity of iron sulphides, seemingly as original rock constituents, but prob-

ably as impregnations. The same impregnation of the iron sulphide was found in many of the larger masses of acid volcanics, notably a boss-like mass of granitic porphyry, south of the pass by which we left the Kuskulana River. It is not impossible that these pyrites may carry copper, and in some cases silver and gold. Should they be found to do this, they will prove of great economic importance, as the ledges are sometimes very large. Specimens of these rocks were collected, but assays of them have not as yet been completed.

Several ledges are reported to have been located on the lower Kuskulana, where it cuts the metamorphosed sedimentaries of the lower Chettyna Valley. It is not impossible that gold may be found in the metamorphosed shales and slates of this area.

The occurrence of veinlets of cinnabar and sulphur at the head of the Kotsena River has been noted.

While workable ore deposits have not been shown to exist by actual exploitation, the information collected shows the area to be a mineralized one and one favorable to mineral concentration, an area, therefore, warranting a detailed economic survey.

PLACER DEPOSITS.

The most promising discoveries of placer gold in the Copper River country to the present time are those of Quartz Creek, Fall Creek, and the Chestochena River. While some good, coarse gold has been taken out of both Quartz and Fall creeks, these areas are as yet entirely undeveloped, and it remains to be proven whether or not they will be found paying. The formation underlying them is the same and corresponds to that named by Schrader, the Klutena series, which, he suggests, resembles in many respects the Forty Mile series of the Yukon district.

The continuation of this series of rock was not traced, but it probably is not limited by the area thus far outlined.

Of the Chestochena River very little is known other than that the prospectors who returned late in the past season reported the discovery of prospects to which they intend to return in the spring. The reported discovery of platinum placers caused a rush to Mount Drum last year, and a second one at the opening of the present season. So far as known, however, no platinum has been found.

NARRATIVE AND ITINERARY.

The discovery and development of copper claims on Prince William Sound revived an interest in the numerous reports from different sources, some of which date back to Russian times, representing the country drained by the headwaters of the Chettyna, Tanana, White, and Copper rivers, rich in mineral deposits, and particularly those of native copper. This, together with its apparent rugged and volcanic nature, conditions not unfavorable to mineral concentration, made this area the objective point of most of the prospectors who remained in the Copper River country during the season of 1899.

Beyond the information contained in the report of Lieutenant Allen, who ascended the Chettyna to the Nicolai house, and the Copper to Batzulnetas, and of Lieutenant Schwatka and Mr. C. Willard Hayes, who crossed the range by the Indian portage from the White to the Chettyna rivers, nothing definite was known of the areas. Various vague and conflicting reports were in circulation among prospectors, some claiming that the Copper, above its confluence with the Slahna, is a very small stream and drains a very limited area, and others, including all publishing maps of the area, giving to it the entire drainage basin east of the Wrangell Mountains and north of the Chettyna Valley. One widely circulated story reported the Copper as disappearing under and, later, again emerging from a great glacier descending the side of Mount Wrangell.

These conditions made it exceedingly important to the development of the country, and to the work of prospectors engaged therein, that this area should be thoroughly explored and its geography determined. Under orders I undertook to do this during the past season. My instructions were to work up the valley of the Chettyna with pack horses, and, while doing so, examine the divide bounding it on the north for a possible opportunity to cross it. Such an

opportunity appearing, to cross the divide to the head of the Copper River and work down the same, assuming, of course, the generally accepted notion that the drainage of the Copper bounded that of the Chettyna. If it were found impossible to cross the divide with the pack train, the same was to turn back and the journey continued with the dog train, which was taken for that purpose. In addition to making a general topographic reconnoissance map of the area, I was instructed to study the geology and mineral resources as thoroughly as conditions would permit.

The party consisted of two packers, J. V. Place and Archibald Crawford, to handle the pack train, and John Fohlin to handle the teams, consisting of nine dogs. The provisions selected were calculated to last four men one hundred and fifty days, and in addition to the regular camp outfit we carried two 11-foot King canvas folding canoes for crossing glacial streams too deep for the horses to ford. This precaution was deemed very important in view of the difficulty in crossing glacial streams experienced by the Schrader party and the serious accident that befell it in attempting to cross the Tonsena River on the previous year. Unfortunately, but five horses could be spared for this work, but additional horses and packers were detailed to assist in crossing the coast mountains.

The necessity of waiting for the completion of the trail through the Keystone Canyon delayed our start until June 18. At camp 2, at the foot of Keystone Canyon, which we left on the morning of June 19, we were joined by Rice's party, which was conveying Mail Inspector Wayland from Valdez to Eagle City on the Yukon. With them were also Mail Contractor Holman and two prospecting parties, one McCarthy's and the other Young and Downing's. From the end of the trail through Keystone Canyon we proceeded up the gravel flats of Lowe River to the government cabin. From here we went, in one day, down to the Chena River, where we found encamped a number of prospecting parties who had come in early in the season. Among them were the parties of McClellan, Amy, Millard, and others. They joined the caravan which was following us into the interior.

From here, after going down the gravel flats of the river some 3 miles, we were obliged to make a trail along the southerly bank of the stream for a distance of 8 or 10 miles. We then crossed the stream at a point where it was spreading and shallow, and continued down its northerly bank some 3 or 4 miles farther, making our way through a gap in the range to a point on Stewart River some distance above its mouth.

Traveling was very difficult, and we were four days making the distance from the first camp on the Chena to the mouth of Stewart River. The river breaks through five different box canyons and the banks are everywhere rugged and precipitous. It seemed to me that the best route for a permanent trail would be to keep from the Lowe River divide along the foothills on the right, thence proceed down the right bank of the Chena for a distance of some 8 miles, where it flows through a narrow, rocky gorge that a short bridge would span, and then continue down the northerly bank of the river through a gap by which we reached the Stewart River. This river just above the point at which we crossed flows between two projecting points, which a short bridge would span. These facts I reported from Quartz Creek.

From Stewart River we followed the right bank of the Kanata to Bowlder Creek, where we camped. It was reported that a low divide led from the head of Kanata to the southerly branch of the Tonsena, but we were unable to find anyone who would give us any definite information regarding this route, and, whereas it probably involved much trail cutting and possibly considerable swampy ground, I preferred to go over the known route by way of Quartz Creek. Accordingly, we followed the left bank of Bowlder Creek up the mountain side to an elevation of about 2,000 feet, and then traveled along a bench above timber line to the Quartz Creek divide. We found this divide, as we had the Lowe River divide, almost free from snow, but exceedingly soft and miry. Nevertheless, we managed to make the distance from Bowlder Creek to the confluence of Bear and Quartz creeks in one day.

From here one day's trip took us to Tonsena Lake, a distance of about 7 miles. The best information I could get led me to believe that the Indian trail eastward from Tonsena Lake led to the Stickwan House, on Copper River, a few miles south of Copper Center. In view of this,

and the fact that the pack trail would have to make a relay trip, I decided to send it over the known trail to Copper Center with the first loads, and while it was making this trip Fohlin and I would explore the trail to Copper River. We found that this trail, after following the Tonsena River in a general way for about 25 miles, led away from the river in an easterly direction, reaching Copper River at a point about 8 miles above the mouth of the Tonsena. The trail was very indistinct and very difficult to follow in places. I therefore sent Fohlin back to mark it thoroughly, trim it out where necessary, and guide the pack train over it when it returned to Tonsena Lake.

While this was being done I undertook a side trip up the Kotsena River, which was at this time attracting much attention. I arranged to travel with two prospectors, Millard and Warner, who were on their way to locate a copper vein, regarding which they had information. I wished very much to see this vein in order to study the conditions under which the copper occurred. We went down the Copper River some 15 miles by boat to Indian Bellum's house; from here a good trail leads to the point where the Kotsena River emerges from the mountain. After going to this place, we continued on up the river, passing several prospecting camps on the way.

When approaching the head of the river we met about a dozen men who had just abandoned their camps and were on their way to Valdez. These men had sledded their outfits from Copper Center up the valley of the Lebigstad and over the divide separating this from the Kotsena early in the season, in an effort to cross the range between Mount Wrangell and Mount Blackburn, and thereby reach what they supposed to be the headwaters of the Copper. This they found to be impossible and they had found no prospects whatever of placer gold on the Kotsena. Disappointed, they had abandoned everything, and were taking with them only enough clothes and provisions to enable them to reach Valdez.

After spending three days at the head of the stream in mapping the surroundings and examining the rocks, I started back down the river. I left the foot of the Tonsena trail on July 1, and returned to that point on the 10th. The next day, with the help of some Indian guides, we cut a short trail, connecting the Tonsena trail with the Schrader trail, which led down the Copper along the top of the bluff. Over this we took the pack train to the mouth of the Tonsena River. Here we spent the day repairing the outfit and seeking the best place for crossing the horses. The river at this point was wide and swift and full of treacherous quicksands, and the water at this season of the year very cold. By picking the way carefully and swimming the horses across one of several channels at a time, and giving them time to rest on the bars between, we succeeded in crossing without the loss of a single one.

From this place our goods were carried down the river in a boat which I secured from the natives, and we took the horses down the eastern bank of the river to the Chettyna, which we reached two days later. An Indian trail leads along the eastern side of the river most of this distance, and had we not improved it considerably in places it would have been impassable for the horses; even then it would have been impossible to have taken them over it had they been loaded. I learned from the natives that an old Indian trail led up the northerly side of the Chettyna River some five or six days' travel, but none of the Indians I had met thus far knew of this trail, and it took us three days to find one that did know of it.

On leaving Valdez we took about 200 pounds of dried fish for dog food, hoping to be able to get all we needed from the natives along the Copper and Chettyna rivers. In this I was disappointed. Being unable to secure food for them, I had to abandon the plan of taking the dogs farther. One of them had become exhausted on reaching Quartz Creek, and another had run away at Tonsena Lake. The remaining seven I sent with Rothkrantz, instructing him to take them to Copper Center and turn them over to the Government station there. Extra help for cutting trail and the numerous guides we had engaged had reduced our rations somewhat, and these I replaced from the cache of McCarthy.

From McCarthy's cache on the Chettyna, about 3 miles above its mouth, which we left July 21, we followed the banks of the Chettyna to camp 2, a distance of about 8 miles. The river bank is here very high and very rough, and the best trail we were able to make was exceedingly rough and difficult for traveling. Had it not been for the high water we would have avoided this

by traveling up the bars of the river. We cached half of our outfit here and continued with the rest. The old Indian trail begins at camp 2, and from here leads away from the river at nearly right angles to its course.

We found the country back from the river rolling and covered with boggy marshes and small lakes, making it necessary for the trail to meander very much at times. One day's trip took us to the banks of the Sterlena, a distance along the trail of about 12 miles, and another day took us well up into the mountains along the westerly bank of the Kuskulana. This stream, which we found to be a swift glacial stream of about the size of the Kotsena and Tonsena, was too deep to ford. We were, therefore, obliged to continue up its right bank to a point about a mile below the glacier in which it heads. Here it spreads into many channels, and we forded it without difficulty.

Instead of retracing our steps down the left bank of the valley, as I expected we would do, the Indian trail turned into a narrow gap in the mountains on the easterly side of the river. This route afforded us a splendid opportunity for the work we were doing, and if it led through to the headwaters of the Chettyna, would be an ideal one. We were unable to learn from the guide anything regarding it, except that "it went a long ways," and that it was passable for horses. Trusting that it would enable us to reach the upper waters of the Chettyna, we followed it. We camped that night at timber line, about a mile and a half east of the Kuskulana. Horse feed was scarce here, and our horses for the first time on the trip turned back, and were not overtaken by the packers until late on the following afternoon.

From the Kuskulana to this camp the trail was rather steep in places and somewhat difficult, and it required considerable improvement. From the camp on the grade became easier to the divide, which we crossed without much difficulty. After crossing a small valley drained by a stream which flowed through a narrow gap in the mountains to the southward, which I called Fitch Creek, we entered a broad open valley transverse to the drainage of the country. This was so boggy that the Indian trail led along its southern edge, and after following it for a distance of 5 or 6 miles turned abruptly across a spur of the mountains and entered a valley to the southward. From this point where the Indian trail turned off there was before us, transverse to the general direction in which we had been traveling, a broad, open valley occupied by a stream which, heading in a glacier to the north, followed this valley for some miles and, at a point about opposite us, turned abruptly and continued in the direction we had been traveling.

To the north of the gap through which this river flowed was another occupied by a small stream emptying into the river. Through this it seemed to me highly probable that we could make our way. The stream before us was called by the Indians the Lachena, and our Indian guide told us that the trail led to his salmon cache on this stream, a short distance above the point where it enters the Chettyna. The Indian knew nothing of the valley to the northeast, and could not tell me whether it were possible to get through it with the horses.

After spending a day looking up the train, we made our way over much boggy and swampy ground to the elbow in the Lachena. Since it was necessary to make a relay trip for provisions, I decided to send the pack train back from here for this purpose, and before going farther with the train to explore ahead and determine whether it would be possible to go through the valley.

At the end of five days we had made a trail up the valley a distance of about 15 miles and were encamped on the divide. Here we spent several days on topographic work. From one peak I saw that the valley we were in narrowed down to a canyon, which led out into a broad, open valley occupied by a huge glacier, the foot of which I could not see. We were traveling along the most favorable route for the work we were doing, and I decided to continue and work our way out along the glacier, and if we could not succeed in this to attempt to cross it. We experienced some difficulty in working down the canyon, but succeeded in making a trail over which we took the pack train later without accident.

While working our way down along the right-hand side of the glacier, which we found very slow work on account of the rough ground and heavy brush, we were overtaken by the pack train. We managed with much difficulty to get our horses around the foot of the glacier. From Mount Blackburn eastward there had been no break whatever in the extremely high range along

which we had traveled. A short distance ahead, however, there appeared to be two lower gaps in it, which I had hoped to reach by going up the next valley beyond the one occupied by the glacier.

This valley was occupied by a small stream, which empties into the glacial stream just below the foot of the glacier. Three days sufficed to take us up this stream, which I called McCarthy Creek, to its head, a distance of some 18 or 20 miles. Rainy weather had set in and fogs and low hanging clouds prevented me from getting a view of the surrounding country for three days. When I could see I found that the head of this valley still abutted the high ridge and that it was the second valley to the east that led to the seeming break in the ridge.

There is no way of getting through into the valley to the east from this point and we were obliged to retrace our steps down the creek 8 or 9 miles to the mouth of Nicolai Creek, so named because it lies on a copper vein from which Chief Nicolai got the specimens which he displayed, and the location of which he refused to disclose until this year. At this point there is a break in the ridge to the east, through which I hoped to be able to go. Cloudy weather again delayed us, but when it cleared I found that the next valley to the east was occupied by the Nezena, a great northern fork of the Chettyna, and that this stream headed some 12 to 15 miles to the north in a great glacier, one summit of which was in plain view, and was not more than 30 miles away. A careful examination of this glacier with the powerful glasses I carried inclined me to believe that it might be possible to make our way over it.

In addition to this summit there was another, reached by the lobe of the glacier which joined from the west. Eastward was an extremely high ridge surmounted by a very prominent peak, which I named Mount Abercrombie. It was plain that the only possible opportunity for crossing the ridge to the north was by way of one of these glaciers. The mountain which I occupied was 4,000 feet above the bed of the river and led down to it by seemingly almost perpendicular walls, along which it seemed almost out of the question to find a way down into the valley. The Nezena, however, is a large stream and at this place was too deep and swift to be crossed with horses. Just below this point the confluence of the heavy fork from the east (125) causes it to wash a perpendicular wall on the westerly side, making it impossible to come up along this side. It was, therefore, plain that there was no hope of getting into the valley of the Nezena except by finding a way down along the mountain side.

We brought our camp across the mountain to a point where we could reach timber line and from here a careful search finally enabled us to find a trail over which we succeeded (after improving it) in getting the horses into the valley. It was a most difficult trail, however, and while the horses had gotten down it was a question whether they could ever be gotten up again. In order to cross the glacier, it would be necessary to have sleds or toboggans on which to haul our outfits. I accordingly sent to the Nicolai house, which was on the opposite side of the stream about 6 or 7 miles below, to see if it was possible to find some sleds there. We were rewarded by finding two old sleds. From here up the valley we were able to keep along the west side of the stream and avoided crossing any considerable channel. One day's trip took us to the foot of the glacier (126), a distance of about twelve miles, and another day carried us some 3 miles farther along the westerly side of the same.

From a prominent peak near by, I saw that the first great left-hand lobe of the glacier abutted the main ridge, but that beyond this a second glacier lobe led a long way to the westward to what seemed to be a lower divide (129, 130) than the one directly north of the head of the stream. Even if this divide was so much longer than the one directly north, the approach to it was so much longer that the grade would necessarily be easier and the glacier smoother. I therefore decided to try this before attempting the one directly north, although the latter was bounded on the westerly side by a bare ridge, which seemed to offer a fair chance of reaching the summit. The foot of the glacier was exceedingly rough, but it seemed probable that after we were once well upon the glacier it would be possible to make fair headway with sleds. My plan was to have the packers assist Fohlin and I in sledding our outfit to the summit and from there have the packers return to Valdez; while Fohlin and I would attempt to make our way down the opposite stream heading in the glacier, which I felt sure was Copper River. There I

desired to set up the canvas canoe I had with us and construct another of canvas sacks and pack covers, and in them run down the Copper River to Copper Center.

Fohlin refused to go with me over the glacier and I succeeded in engaging a young prospector named McNeer, who, with two others, had been following us, to take his place. It was now August 26, and McNeer informed me that the previous year much ice had begun to run in the Copper River on September 25, and that after October 17 it had been absolutely impossible to get down the river. It seemed to me, therefore, that October 10 would be the latest possible time at which we could figure on reaching Copper Center by boat.

We started on the morning of August 26. After we had carried the outfit well out upon the glacier we loaded it upon the sleds (143). We had not, however, gone a quarter of a mile with these before we were hemmed in with rough ice, and at the end of several hours' hard work, had to abandon the sleds and take to back packing. With about one-half of the outfit on our backs we managed to reach the foot of the ridge between the first two great lobes of the glacier. Here we found some brush and made camp. I sent the men back to the camp at the foot of the glacier to bring the provisions and the remainder of the loads the following day. I then went up the glacier to determine whether or not I would make the attempt to go up this lobe or the one directly north (140). I made a distance of about 7 or 8 miles, and after spending the night on the edge of a moraine continued 5 or 6 miles farther to a point from which I could see the summit of the glacier (127, 128, 132, 139, 142). It was far less steep and rugged than the easterly one, and I decided without hesitation to try this one in preference to the other, although the distance from the foot of the glacier seemed to me nearly 30 miles.

The next morning the weather cleared a little, so we started to take our loads as near the summit as possible. At 2 o'clock in the afternoon we had made a distance of about twelve miles, and were approaching the foot of a heavy bench when the fog closed in so that we were unable to see but a few yards in any direction. Under these conditions it was impossible to go farther, so we cached the goods and retraced our steps as well as possible. Fortunately the fog raised long enough to allow us to get back to one of the big medial moraines (132), and by following this we made our way back to camp without trouble. The next day the fog was so dense and heavy we could not move.

On the following morning, August 30, the weather cleared somewhat and we started out, reaching our cache without trouble. Here we camped. The next morning we found a heavy north wind blowing, bringing with it frequent flurries of snow. We packed our outfit to the top of the bench and loaded about one-half of it on the sleds and started for the summit. We traveled in a northeasterly direction diagonally across the glacier. Before we reached the foot of the last bench, a distance of about 4 miles from camp, the wind and snow had increased to a howling blizzard and we were obliged to cache our loads and return to camp.

When morning broke, September 1, the storm was still raging and we were obliged to remain in camp. On the morning of the 2d the weather, though still cold, had cleared and we started out very early. At 10 o'clock we had reached the foot of the summit bench, where our goods were cached. From here the best and, in fact, the only course seemed to be right up the middle of the glacier. On either side were tremendous cataracts, which seemed to preclude all possibility of crossing them. We had not gone a quarter of a mile from the cache, however, before the crevasses became so numerous and so large that we decided, before going farther with our loads, to explore ahead. Ordinarily crevasses are not continuous for long distances. Splinters cut diagonally across them. This offers an opportunity for crossing, and by working back and forth it is usually possible to make headway even over a badly crevassed area.

On this glacier, however, we found two sets of heavy crevasses at nearly right angles to each other, cutting into isolated rectangular blocks over which it was all but impossible to make headway (131). This condition was aggravated by the loose snow of the previous day, which had everywhere built snow bridges across the crevasses, often completely masking them. In order to avoid walking deliberately into a crevasse it was impossible to take a step in any direction without first carefully feeling the way with a stick. Fastened together with a life line around our waists, one felt his way ahead, while the other followed in his steps at the end of the

line in order to check his fall should he break through. In this way we worked back and forth, and often, when about ready to give up and return, we would manage to find a wedge or snow bridge strong enough to bear our weight, and thus enable us to get to the next block ahead.

At 2 o'clock that afternoon, after four hours of most trying work, we had made but a quarter of a mile. We had, however, crossed the worst part, and had now reached an elevation at which the crust of the snow was beginning to be sufficiently strong to bear our weight over the crevasses. From here on the grade was slight, and we reached the summit, a distance of about 3 miles, without difficulty. From the summit we could see nothing ahead but a broad, smooth plain of snow (127, 128), which seemed to break down abruptly some 8 or 10 miles ahead.

The next morning broke clear, and at 9 o'clock we were at the top of the bench with our loads. From here on the surface was bare and smooth, with a covering of 6 or 8 inches of snow (133, 134), over which we made good time. In view of the difficulty we had experienced in reaching the summit, we were much concerned regarding the possibility of getting down on the opposite side. The two great sources of concern were the zone, along which the snow was sufficiently deep to obliterate the crevasses, but not strong enough to support a man's weight over them, and the other was the great bench over which the glacier breaks from the mountain into the valley below. Under the most favorable conditions we could only hope that the zone would occur on the bench, and that it would be possible to get around both over a moraine bordering on the glacier at this point. Indications from the summit favored this supposition, and as we approached the top of the bench we came in sight of a moraine along its western edge. However, when within 2 miles of this the crust of the snow began giving way, and soon after we began stepping through it into cracks. As yet these were narrow, but conditions along the edge of the glacier and the conformation of the valley before us indicated larger ones (141). The surface was perfectly smooth and gave no evidence of its treacherous nature.

While at this point discussing the situation, the surface of the glacier suddenly began swaying up and down in a most amazing manner. At the time I took this to be an earthquake, due to a fracture at some point in the glacier, but later I learned that it was due to the great earthquake which shook the entire country around. A careful survey of the situation showed us that there was only one possible way of reaching the moraine, and that was squarely down the middle of the valley before us. We accordingly fastened ourselves together with a line about our waists, tied our sleds together, and each carrying a stick with which to span a crack, and support himself in case he went through, we started out, trusting we might not meet a crevasse too wide for these means to save us if one of us fell through. Slipping into unexpected openings up to our knees or our waists every few paces, and not knowing at what moment a large opening would take us in bodily, traveling was uncomfortable, to say the least. But there being only one course to pursue, we pushed ahead as best we could, and at the end of two seemingly long hours reached the moraine. Here, to our great satisfaction, we found that the moraine on which we were camped continued along the glacier for several miles. The next morning found us ready to leave camp at the first sign of day. The sky was overcast, but the summit was clear when we started out, and we hoped that it would remain so. The necessity of picking our way clearly had obliged us, on the previous day, to expose our eyes frequently to the intense glare of the snow, and before night we had experienced symptoms of snow-blindness, which this morning grew rapidly worse in the cold wind which blew from the summit. While going over the divide, where traveling was good, we were able to keep our eyes covered most of the time, but on working on the bench it was necessary to use both eyes and to have them uncovered. Before we reached the top of this bench, on the return journey, both of my eyes were all but useless, and one of McNeer's was totally blind. Whether his other eye would hold out, and enable us to get back to the camp, was a serious question. With the prospect of wandering about on the top of the glacier in a blizzard, without food or blankets and unable to see, staring us in the face, added to which was the necessity of crossing crevasses, caused us no little concern that afternoon. In fact, by the time we got to the crevasses the pain in our eyes was such that neither of us cared seriously how soon he fell into one. We finally reached camp, where we took to our blankets, and did not

again leave them until the morning of the second day. We were in an exposed position, so we managed to pack up and move the tent about a quarter of a mile into a ravine.

Our eyes being considerably improved the following morning, we began packing our goods down the moraine, and on the afternoon of the second day we had them once more loaded on our sleds on smooth ice at the foot of the great bench. Now that the question of getting over the glacier was practically disposed of, the subject of absorbing interest was which river drainage we had reached, the Copper or the Tanana. From the summit we had seen a large open valley, seemingly at the foot of the glacier and leading off toward the northwest. Now we found this valley was cut off by a range of low moraine-like hills, which caused the glacier to turn slightly to the east, and, as we traveled down it, we saw more and more of a wide, open valley leading to the east. The glacier headed directly for this valley, and we were about satisfied that this was the Tanana River, when we saw that the drainage was toward and not away from it, and that the river from the foot of the glacier turned abruptly around a prominent mountain opposite the foot of the glacier on the left-hand side. We were now satisfied that the river entered the valley to the northwest and that it was, without a question, Copper River.

We spent one more night on the ice, and the following day, shortly after noon, we came to the foot of the glacier, which, being free from a terminal moraine, enabled us to go down easily and to make camp on solid ground that night. We had been on the glacier just fifteen days, and during this time we had nothing to eat but frozen bread and bacon and mutton, except oatmeal or corn-meal mush and a little tea.

On the day after our arrival at the foot of the glacier, we climbed the mountain to the north of our camp, and got a view of the country farther on. To our amazement we found that the drainage of the valley toward the northwest was toward and not away from us and that this joined the glacial stream and the drainage from the valley to the east and broke through the mountain midway between the two valleys. We were once more in doubt regarding our position, with indications favoring Tanana drainage. Through the gap to the northwest, however, we saw a large, open valley beyond us, and this we felt was Copper River Valley.

The following morning found us sick with colic, and we were unable to start, and thus we spent three days before we discovered that the cause of this was the water we were using. As soon as we stopped its use our condition began to improve, and we were soon able to move on.

The glacial stream was at this time very low, and we were obliged to pack our goods about 3 miles, to a point where a number of channels joined, before we were able to use our canoe. Here we put our goods into the canoe and "lined" the same down the river. The river was so shallow and branched so frequently that our progress was but little faster than packing. In this way we reached the fork of the river three days after leaving camp at the foot of the glacier. From here we saw that the river turns strongly east and leaves the mountain not more than 8 or 10 miles farther on. This left no doubt but that it was a branch of the Tanana.

On account of the constant wading in the ice-cold water for the past two days, McNeer was taken with cramps so that he was unable to move one foot. Nevertheless, we started out with our packs the next morning, and when we laid them down that afternoon we were not less than 7 miles from camp. The next day we put the camp ahead 10 miles, and, alternating in this way, the afternoon of the sixth day found us within a few miles of a wide valley, seemingly occupied by a very large stream. We were now sure that we had reached the Copper at a point where it was sufficiently large to enable us to use boats or rafts, and we thought we saw the end of back packing near at hand.

From this dream we were rudely awakened a little later when we noticed that the snags on the river bottom pointed in the opposite direction to that which we expected. The stream instead of flowing westward ran east, and after seven days of hard packing we had merely reached another branch of the Tanana. The smaller channels of the river were frozen over, and mush ice was running heavily in the main channel.

A week at hard packing had reduced our provisions about half. It required very little reflec-

tion to convince us that we must discontinue our search for the Copper River, and that our comfort and safety required us to make our way down the Tanana to the Mentasta trail with the least possible delay, as the ice might close in any day. To Copper Center by this route was a long trip to undertake on the rations we had left, but we hoped to be able to get dried salmon and moose meat from the natives on the trip. We could not afford the time necessary to make a canoe, and therefore concluded we must trust to a raft.

The next day we returned for the last pack load of goods, and on Monday we built two rafts. The river was, in places, very spreading, and there was some doubt whether we should be able to navigate it by raft. We, therefore, decided to build two small rafts, rather than one large one, since they could be gotten off more easily if grounded. Early on Tuesday morning we started down the river. We had made a distance of from 6 to 8 miles when a little carelessness in meeting a cross current upset my raft and ducked me in the river. It was so cold that there was nothing to do but build a fire and dry out. While we were doing this an old native came up the bar. He was unable to understand English, and I sent McNeer with him to his camp for provisions. He soon returned with two younger men, sons of the old native. While we were reloading our raft and preparing to go to their camp a sudden wind sprang up that whipped up the dust of the flood plain in a manner unlike anything I have ever seen. The sand in the air was so thick that it was impossible to see more than a few rods, and to face it was positively out of the question. We cached our goods, pulled our rafts out of the water, and hastened to shelter on the bank. We found the natives encamped on the lee side of a high bluff that offered good protection from the storm, and we camped with them. They confirmed our impression that the river we were on was the Nabesna, the western branch of the Tanana, and we learned that a good trail leads from this point to Batzulnetas, on Copper River.

We endeavored to engage these men as guides and packers, but they refused to go. After spending the night and most of the next day with them, coaxing and making all sorts of promises, they finally consented to go with us. When we had gone but a short distance they began begging to be allowed to turn back, and finding that I could do nothing else with them, I promised to allow them to do so if they would take us to a point at which they could indicate to us the trail ahead, so that we could find it without their help.

We entered at almost exactly the one through which we had reached the river basin, and, after making about 8 miles, went into camp. The next morning it was raining, and the natives were unusually hard to start. We made about 6 miles to the bank of the lake. It was now so cold that the lake was frozen over and there were several inches of snow on the ground. We reached the Batzulnetas on the afternoon of the sixth day.

We had been informed by our guides that we could raft from Batzulneta, but we found the river so low that this was impossible, and, as a consequence, we were obliged to pack to the mouth of the Slahna. We arranged with a native known as Sanford Nicolai, who was coming down the river in a skin canoe, to take as much of our outfit as we were unable to pack at one load to the mouth of the Slahna for us. Packing to the Slahna we built a raft, and when Nicolai came along we followed him down the river. Our guide pointed out a large bateau on the bank, which was in good condition and we prepared to launch it, but the native objected, claiming that it belonged to him and another native. By promising to pay him for it we gained his consent to use it. It was a very large and heavy boat, and had about 6 inches of ice in it. Nevertheless we managed to get it into the water, and after making a few miles more, we went into camp with the native.

The next morning we started out in good season, and the following night we were in camp at the mouth of the Chestochena. This river has been attracting considerable attention, and I wished to explore it. McNeer had left provisions in a log house (148), about 25 miles up the stream. To this we decided to go, and, if the provisions were undisturbed, to take what we needed, and make a side trip up the stream. If for some reason the food was gone, we would return and continue down the river. Mush ice was forming at this time in Copper River rapidly, and the nights were exceedingly cold. We left the mouth of the Chestochena, and made a distance of 18 miles before night.

The next morning we started for the cache, which we reached about 10 o'clock. We found that not a bit of provisions of any kind had been left. We retraced our steps down the river at once, and the next morning we were once more at its mouth. The ice in the river was now alarmingly heavy, and we lost no time in getting away. The mush ice was so thick and strong that it was difficult to move the boat through it, and with the great number of bowlders which the extremely low water of this season brings to the surface navigation was difficult and exciting. With the help of two natives, who owned the boat, we managed to run (136) to Copper Center, where we arrived that night.

I expected to find here either the dog team or some pack horses with which to make our way to Valdez. Not finding either, we waited for the arrival of Mail Contractor Holman, expecting to get instructions for our further movements through him. He arrived on point of time, but without instructions for us. I made arrangements with him whereby, in consideration of my indicating to his men a trail from Copper Center to the Tonsena River, he agreed to carry part of my outfit to Valdez.

The route proposed was a desirable one for my return to Valdez, as it enabled me to do topographical work, besides giving me an opportunity to look up a route which I considered favorable for a permanent trail. With three men and two horses I left Copper Center on October 18. We crossed the Klutena at Copper Center, and following what is known as Copper's trail, we reached Copper's camp that night. The distance from Copper Center by trail is probably about 10 miles.

The next morning we continued in a direction calculated to take us along the eastern edge of the mountain. The timber was close, and after a hard day's work we had made not more than 8 miles. We had, however, reached the foot of a lake several miles long, and had moved well around the end of the mountain range. A due south course on the next day took us over a fine, flat country to the Tonsena River. This we reached by working down the valley of its northward branch on a gradual slope, through a long draw, and then following the valley down for a distance of about 1 mile to the valley of the main river. We camped on the Tonsena, and continued the next day on our way. The lakes were now frozen so that we traveled on them in perfect safety. The Tonsena River was partly frozen, and we experienced considerable difficulty in getting the horses across it.

It was my impression that the branch of the Tonsena leading to the head waters of the Kanata was the one immediately opposite the one by which we had entered its bottom. Johnson, one of Holman's men with me, has been through this pass, and consequently was supposed to know, so I accepted his corroboration of my impression. After working our way out of this valley by a gradual slope to the westward, we traveled along the top of the bluff, when night overtook us, after having not made over 6 miles. The next day Johnson failed to find landmarks, and I began to doubt whether this was the proper creek, and before we camped that night Johnson was convinced that it was not. There seemed to be a pass to the southwest, and we decided to attempt to go through this in preference to returning back and going to the other creek.

We had attained considerable elevation, and it was bitter cold for camping without a tent or other protection other than a brush shed. The snow was about 20 inches deep, and it was not without considerable difficulty that we succeeded in making our way to the summit. On reaching this, we found ourselves at the edge of a considerable valley extending indefinitely in both directions. It took us some time to realize that this was the divide between the Kanata and the south fork of the Tonsena. We were fully 2,000 feet above it, and when we finally reached the valley we found a newly-cut trail, which we knew to be that of Lieutenant Babcock's party. Following this we reached Fall Creek that night, and the Government stable the next night. From that point the next two days' travel over the new Government trail brought us back to Valdez.

THE GAKONA AND CHESTOCHENA RIVERS.

By Guide ADDISON M. POWELL.

I began my journey August 21, 1899, taking with me two horses. I reached Quartz Creek Divide August 22. Here I met F. J. Date, of Elkhart, Ind., whom I employed to accompany me as an axman. On August 24 I crossed the Quartz Creek Divide, and slept that night at Quartz Creek mining town. But few men were mining here, and although they had $500 or $600 worth of coarse gold dust, they claimed it was not a shoveling proposition, because of the numerous large bowlders encountered. Twin Lakes was reached August 25. Here I took the altitude of the sun and found we were 61° 45′ N. Here also we came across the grave of the prospector who had died on his way to Quartz Creek during the rush to that place last winter. At Grayling Creek, the next day, we found the grave of a disappointed prospector who had killed himself during a spell of despondency. I reached Copper Center, at the mouth of the Klutena River, August 31. At the time of my visit the town was composed of log cabins built by prospectors. On Sunday, September 3, at 3 o'clock in the afternoon, I felt a serious seismical disturbance. I looked in the direction of Mount Wrangell, which had not been smoking much for several days. It was now smoking very heavily and was discharging a large amount of lava, which descended the northwestern slope for several miles, and which appeared to melt deep gorges in the snow and ice. The next day the wind drifted the snow over the blackened area. Mount Wrangell continued to smoke with unusual animation for the rest of the season. On Monday, September 4, we swam the horses across the Tazlena River and met a dozen Indians. We found them to be a jovial and sociable lot. They claimed they were Gulkana Indians and that they lived near Gulkana Lake. They were on their way to Copper Center to trade skins for mucky-muck. They feared that too many white men in the country would cause them (the Indians) to starve.

The next day we continued our journey through the spruce timber. It took us two days to reach Gulkana River. This is a clear stream coming from the north and is the outlet to Gulkana Lake. The next morning we forded the Gulkana and also reached and crossed the Gakona River. The following day we passed the mouth of the Sanford River at a point where it empties into the Copper from the south, about 6 miles above the Gakona.

On September 9 I left the Copper at the big bend, about 5 miles above the mouth of the Sanford, and advanced north about 10 miles for the purpose of examining the foundation for a trail between the Gakona and the Chestochena rivers. After traveling over prairie ground and winding between lakes for about 12 miles, I camped in sight of the Gakona River.

Our course for the next five days was generally between north and 20° east of north. The higher the ground and the farther away the Copper the more the lakes and swamps were encountered. It seemed impossible to travel more than 8 miles a day. We crossed miles and miles of tussocks, large and shaky. Our horses became experts in stepping from one to another, a failure to land on them causing them to flounder in the mire between. We followed an old Indian trail, passing an abandoned village, where signs were written with charcoal on a cache post indicating that two men, two women, and three children had gone up the river, passed through some timber, crossed the Gakona, and were hunting in the hills.

On September 13 we camped on the foothills of the divide between the Copper and the Sushitna. Here we found fine feed for the horses and frightened a moose which ran out of the divide. We changed our course to 30° E. and spent two days in reaching the head waters of the Chestochena River. We traveled over high rolling ground. In some places, where the ground was nearly level, we found it so soft that it was with great difficulty that we could travel 8 miles a day. At one time all our horses became mired and we were obliged to unpack and assist them to walk for hundreds of yards.

We camped for two days on the Chestochena, about 8 miles from the glacier. During this time it snowed about 5 inches. This glacier is a large one and from it flow two branches of the Chestochena, as well as the East Fork of the Gakona.

On Saturday, the 16th, we moved camp about 2 miles above Chena Creek, which flows into the Chestochena at a point about 8 or 9 miles from the source of the West Fork of the Chestochena. Here were located a number of mining camps. A Mr. Dempsey had discovered placer gold here and he, together with Messrs. Hazlett and Meals, had located a few claims just below the rim rock of the canyon. I washed out ten pans of dirt here that averaged 6 cents to the pan. Gold was found only in the strata of clay, and as but about half of the ground was composed of clay, I suppose the true average was about 3 cents to the pan. I prospected to a depth of 5 feet and did not go to bed rock. I believe this claim, being favorably situated, will pay; but as it costs about $1 per pound to get provisions into the place, it would necessarily have to be very rich. It will take the work of another summer to determine here the extent of pay dirt and its value. The gold appeared to be of a leafy character and very dark in color.

I explored to the head waters of this canyon to see if it was possible to find a pass leading to the head waters of the Tok, but found it encompassed with high, ragged mountains. From the top of these mountains a level pass was plainly seen, leading from the Middle Fork of the Chestochena to near the head waters of the Slahna. I easily recognized a place on the east side of the Slahna, where I had been during the summer of 1898. This pass leads to another pass that would reach the Tok from the Slahna, about 10 miles north of Mentasta Pass.

As it had been almost continually snowing and blowing from the northeast, and as our horses were very weak, I decided to start for Valdez on September 29.

The mouth of Chena Creek, as near as I can determine, is in latitude 63° .04′ N. and longitude 145° .20′ W. The Chestochena River descends from N. 15° W. from its source, from which direction we followed it about 9 miles from the Chena, where the Middle Fork of the Chestochena comes in from N. 20° E. One mile below this fork we found that the river bears S. 25° E., which course we followed for 13 miles, to where the East Fork comes in from N. 20° E. The course of the river from this point is S. 30° W. for 4 miles, where it turns to S. 10° W. for 4 miles, then S. 14° E. for 4 miles, where it empties into the Copper, which point we reached on the night of October 2.

Our progress down the Chestochena was slow and difficult, owing to the thick growth of the spruce trees, the high frozen banks, which we often had to ascend, as well as the quicksand on the bars, where it was not sufficiently frozen to bear the weight of the horses. The crossing and recrossing of the river, with the heavy flow of mush ice, seemed to take the life out of our horses. We were compelled to feed them flour to keep them alive. The snow had obliterated the old Indian trail followed by me the year before, and we were compelled to wander down the Copper, through the thick timber, up and down hill, the best way we could. On October 3 we traveled about 14 miles S. 20°, alongside of an old moose fence that the Indians had built there years ago by cutting and bending down small spruce trees. We camped that night on a high bluff, overlooking the Copper, but so far away from the water we were compelled to melt snow with which to boil our coffee.

On October 4 we traveled for about 10 miles and camped on Tânana Creek, which runs S. 35° W. The prairies here were covered with good feed for the horses. In 1898 they were burned with a view of improving the quality of the feed and, in my opinion, the feed was much better on the burned portion of the prairie. At the mouth of the Tanana Creek, where it empties into the Copper, I recognized the old burying ground of 1898. The little flags, mostly handkerchiefs tied to sticks, were still fluttering in the breeze. On the night of October 6 we were camped about 3 miles below the mouth of the Gulkana River. On October 9 we managed to reach Copper Center. At Copper Center, where there were a thousand or more men the year before, we found one man and he was running a trading post. The night we were in Copper Center the thermometer registered 15° below zero. It was a battle with the elements from here to Valdez. We found the snow about a foot deep on Grayling Creek Divide, and as the wind was blowing hard we were content to crawl into our sleeping bags without supper.

On October 14 we attempted to cross Quartz Creek Divide, but were compelled to go into camp within a mile of the summit, in 3 feet of snow. Here we again fed the last of our flour to the horses. The snow was so deeply drifted and stiff that the next day's work was severe. We

had neither supper nor breakfast and all three of our horses were down before we had gone 100 yards from where we had spent the night. One horse gave out, and I could not get him to make another effort. We succeeded in making the divide about noon. It was but 3 miles down to the Government trail and good traveling. The trail here does not cross the Quartz Creek Divide. We reached station 3 on October 17.

On October 19 I crossed over Lowe River Divide, but the horse gave out near the summit and I was compelled to leave him. On Saturday evening we reached station No. 2, where we were well cared for. We reached Valdez on October 22 in an almost exhausted condition. I am satisfied that but for the trail built by Captain Abercrombie through these mountains I would have perished by the wayside. No more laudable undertaking for the benefit of Alaska can be conceived than the development of its apparently unlimited resources, the opening up of an unknown and unexplored region, and making possible, what was heretofore considered impossible by the prospector, the building of a trail from Port Valdez to the Yukon.

I beg to suggest that the general course of the trail from where it now ends should be about N. 20° E. var. N. 28° 30′ E., until the Chestochena River is crossed. This will carry it along the west side of the Copper River, where there is dry footing, with the intention of crossing the Klutena about 8 miles above Copper Center, at what is known as "Moses Rock." It would then cross the Tazlena River about 1 mile from the Copper. The country between the Gakona and the Chestochena rivers (with the exception of a strip about 8 miles wide along the Copper) is entirely too wet and swampy for a trail.

GEOLOGY OF THE ALASKAN RANGE.

There are but few carboniferous indications on the western slope, althougn some coal float appears on the head waters of the Gakona and Chestochena rivers. This is a glance coal, of high luster, which I suppose belongs to a vein that extends from Kenai northeasterly through Alaska and across the Yukon. There are no tabled or blanketed lodes and very little conglomerate. On the eastern slope of the range are to be found glistening siliceous deposits of no mineral value. There is also to be found a contact of micaceous slate and granite. There are also some unreasonably large lodes of mineralized quartz running in and with this range, but of low grade. They carry little gold and iron, but considerable lead and silver, with sulphides of copper. I also found some specular iron and some placer gold.

THE COPPER RIVER VALLEY.

This valley has the appearance of once having been a vast inland sea. It has a gravel bottom to an unknown depth and is generally undulating and covered with a heavy growth of spruce. Its climate is pleasant and dry in summer and cold and dry in winter. Summer and winter in this region come very suddenly. According to a weather record kept by H. M. Stewart, formerly of Rochester, N. Y., the temperature varied at Copper Center in the spring of 1899 from 30° below to 20° above zero in twenty-four hours. This change was substantial; birds began to arrive and sing; flowers to bloom, and there was no frost. In parts of the valley, where the soil is sufficiently dry and where the moss and timber has been burned, is found a very heavy growth of nutritious bunch-grass. Owing to this and the climatic conditions of the valley, I believe that wheat could be successfully raised. The dry atmosphere, the long, warm days of summer, the light snowfall in winter, are in direct contrast to the damp summers and heavy winter snows of the coast. It is evident that the Copper River Valley is at least 25° warmer in winter than the valley of the Yukon.

BIRDS FOUND IN THE COPPER RIVER VALLEY.

Widgeon duck, summer duck, mallard, green and blue-winged teal, black duck (very large, with blue, flat bill), grebe, loon, black or jack snipe, field or highland plover, grouse, or spruce hen, which are smaller than the Pacific coast grouse of lower latitudes, have no feathers on their feet, and remain in the trees as long as the snow is on the ground. They are not hooters.

INSECTS FOUND IN THE COPPER RIVER VALLEY.

Beetles.—A variety of small beetles are found.

Ants.—Small red and black ants are found in dry, sandy ground.

Bees.—There is a small bumblebee, which acts and looks very much like a honeybee; in fact, it would be common to mistake it for a honeybee, as has been done by other explorers. I myself have not seen a honeybee in Copper River Valley. These little bumblebees live in the high, dry banks of streams. Our horses were frequently attacked by them while traveling along the high banks of the Copper.

MAMMALS FOUND IN THE COPPER RIVER VALLEY.

Moose.—Very scarce and wild.

Caribou.—To be found in small droves or families in the foothills. Not very plentiful.

Mountain sheep or big horn.—Quite plentiful in the old Alaskan Range.

Mountain goat.—Found near the tops of the Coast Mountains.

Silver-tipped grizzly.—Found in the valleys and mountains of the interior. White spot on throat; tip ends of hairs are white; inner coat black. They are very ferocious and give chase to a man in defense of their young.

SCENERY.

No route exists that equals the grandeur and beauty of the scenery found on the trail from Valdez through the valley of the Copper to the Tanana River, Alaska. It is a treat to the lover of natural scenery to hie himself away to the pleasant recesses of these Coast Mountains on a warm summer's day and drink nectar "fit for the gods" from the cool streams. He can almost persuade himself that little gnomes have deposited diamonds therein to enhance the beauties thereof. Precipices, perpendicular walls reaching to astonishing and dizzy heights, where the eaglet is taught his first lesson, loom up before you. We find ourselves vainly endeavoring to comprehend the immensity of these grand and sublime surroundings, trying to realize that the vast waterfalls pouring over the bluffs with continuous roar are fed by melting snows and glaciers far above and miles away. Truly this Coast Range is one vast collection of waterfalls. They roar you to sleep, rumble in your ears until you awake to feast your eyes on their spreading spray, and, speechless with admiration, you stand and gaze at the beautiful and variegated colors of their rainbows.

THE GREAT COPPER RIVER REGION.

By EDWARD GILLETE, Engineer of Copper River Exploring Expedition.

The southern coast of Alaska affords very few good harbors. This appears to be greatly due to the fact that all streams emptying into the ocean carry vast quantities of silt and earthy matter which, quickly depositing as the ocean is reached, form numerous deltas and fill up the neighboring coast line to such an extent that sufficient depth of water for ordinary vessels, especially at low water, is seldom obtained. From the shore back into the interior, the Coast Range presents few practicable routes. Nearly all the canyons and drainages along these mountains are filled with ice. As a rule the natural routes into the interior present an absolutely prohibitory condition for travel. The stupendous masses of mountains and ice-filled canyons and valleys back of the green wooded islands along the seacoast, while forming probably the grandest scenery on this continent, give no encouragement to the explorer or engineer in search of a practicable route for a railroad into the interior of the country, combined with that of starting from a good harbor.

GENERAL DESCRIPTION OF ROUTES FROM SEATTLE, WASH., TO SKAGWAY AND VALDEZ, ALASKA.

The route from Seattle to Skagway, commonly called the inside passage, is well known from the fact that most of the Alaskan and Klondike trade has been conducted in this way. Until recently it was thought that the future development of central Alaska would be governed by this route, which passes through some four hundred miles of foreign country and therefore subject to government over which the United States has no control. The discoveries made recently at Valdez, Alaska, of an excellent harbor, and the practicability of a good railroad line from this point to the Yukon River and the gold country of the northwest, make the comparison of the routes involved one of great commercial interest. The chief objections to the inside passage are its impracticability for sailing vessels (the cheapest method of freight transportation), and the dangers to navigation of the tortuous narrows and delays caused by being obliged to wait at certain places for a favorable tide in order to make the passage. A high rate of insurance is maintained on vessels and cargoes taking this route. Its value in the future will probably be mainly that for local freight and tourists' travel. The prevalence of dense fogs along this coast makes the narrow and crooked channels especially dangerous for navigation. The chief guide for the pilots are the echoes from the neighboring hills when the whistle is sounded. In Seymour Narrows, on the east side of Vancouver Island, the velocity of the current reaches as high a rate as 30 miles per hour in the spring tide, while at all seasons steamers wait for a favorable time in the tides to make the passage. The swift current in the narrows is caused by the flow of the tides in the Gulf of Georgia on the south and those in the Queen Charlotte Sound on the north being suddenly forced into the very narrow passage connecting the two large bodies of water. The outside or open-sea route to Valdez Bay is entirely different. After passing through Puget Sound to the ocean, a direct course is laid for Meiklejohn Straits, the entrance to Prince William Sound, at the head of which Valdez is located. Maximum speed can be maintained at all times by this route, and freight carried to Alaska at a minimum price, which will exercise the greatest influence on the future welfare and development of the country. The distance from Seattle to Skagway is 1,050 miles; from Seattle to Valdez 1,250 miles. This difference is practically offset by the unimpeded passage of the outside route. Valdez being 415 miles west and 120 miles north of Skagway, this port is that much nearer central Alaska than Skagway and 200 miles nearer by railroad to what is known as the Forty Mile country. The ruling question, however, being cheap freights, the element of fast time is not so important a matter as that of furnishing supplies to miners and prospectors at the lowest price possible. Insurance rates afford a fair index of the comparative safety of the two routes, those on the inside passage being double those of the outside passage.

VALDEZ BAY.

Valdez Bay (85), situated at the head of Prince William Sound, in latitude of 61° 05′ 55.6″ longitude 146° 27′ 34″, is a body of water some 10 miles long by 4 miles wide. This bay is open for the entire year, no ice forming anywhere except for a short distance from the mouth of Lowe River, the extreme head, where the fresh water forms at times a comparatively thin skim of ice for a short distance from the shore. The south side of the bay affords the best place for shipping. Here no large streams have dumped their silt and gravel, and but short wharves will have to be built to secure any depth desired. The short line, also, affords the best foundation for mills and railroad terminals. Small streams cut their way through the solid rock at intervals along this shore, affording a magnificent supply of pure water with any pressure quickly secured of service for domestic or power purposes.

On the east and north sides of the harbor mud flats exist (149), formed by the detritus brought down Lowe River, a lake stream, and the numerous streams caused by the melting of Valdez and other glaciers in the immediate vicinity. Where the small town of Valdez has been hastily built there is danger at any time of having the buildings swept into the bay by the swift and quickly changing channels formed by the numerous streams flowing from uncertain and ever-changing

parts of the immense Valdez Glacier, situated some 4 miles north of the town. An occurrence of this nature would doubtless cause the loss of many lives.

THE RAILROAD ROUTE.

It appearing, therefore, that the only practicable point for establishing the business of this port was on the south side of the bay, a preliminary examination of the country from here was made to determine the best route from the harbor to the summit of the abrupt coast range. This range of mountains along the coast appears like a barrier to the interior and consists of a succession of huge pinnacles, commonly called a saw-tooth range, with the depressions filled with vast masses of ice, forming glaciers, which extend at times into the sea. At the sight of these glaciers filling the canyons and coming well up on the sides of the mountains, it is difficult to conceive a more forbidding and impracticable country to locate a railroad line across. A quick glance at the surrounding of the harbor assures one that up Lowe River the only possible route exists, and this, at first sight, appears anything but promising.

However, as one journeys up the broad, smooth valley of the river for some 12 miles, the country shows itself built on a larger scale than at first appeared. The upper end of this valley seems to be surrounded by high mountains; but on reaching the extreme end a canyon is discovered coming in sharply from the left, and the mountain range is found split down to nearly a level with the outside valley. This gorge has been named Keystone Canyon. It is 3 miles in length and connects the upper and lower valleys of Lowe River. This upper valley is similar to the lower one, in that it is broad and flat and covered for the most part to a considerable depth with gravel, suited to make the best roadbed or ballast for railroad purposes. This flat is commonly known as Dutch Valley and is 5 miles long by about 1 mile in width.

At the upper end Lowe River is found to have made a small canyon for itself, which extends some 10 miles to the head of the stream. At this divide, called Marshall Pass, the drainage basin of Copper River is reached at an elevation of only 1,700 feet above sea level, and the coast range is passed. The approach to this summit on the north is a broad table-land, interspersed with numerous little lakes. Beyond this summit the route would follow down the Tasnuna River, on the north side, to Copper River, and thence up that stream through Woods Canyon to the great open valley beyond, from which points on the Tanana River, Forty Mile, and the Yukon are reached with comparative light work and easy grade. From Dutch Valley, however, on Lowe River, it was deemed best, in order to save distance and avoid the heavy work in Woods Canyon on Copper River, to make the climb to Thompson Pass, where the trans-Alaskan trail crosses the divide, and proceed from here in a more direct route across the western drainage of Copper River, holding the elevation obtained and avoiding the heavy rock work, low elevation, and greater distance involved in the route to Copper River via Marshall Pass.

The development of the country in the future will probably necessitate a railroad line over both routes. The line as surveyed has been placed so as to command both routes without loss of distance or grade. From Dutch Valley to Thompson Pass the elevation to be overcome is 2,000 feet. Fortunately for the success of this route the side wall of the valley is formed by a succession of flats called "benches," which are from 50 to 500 yards wide, and which afford a most excellent opportunity to support a railroad line and furnish all the room desired to develop distance and reach the summit with practically any grade desired. An examination of the country from Thompson Pass down to tide water shows two possible routes. One is a supporting line direct from the summit to tide water; the other can be developed by a line along the benches until the valley of Lowe River is reached, from which point the water grade of the stream could be followed to the bay. The direct route from the summit down, while about 6 miles shorter, involves engineering features of such magnitude that it was quickly abandoned. The main features of this route would be the crossing of several glacier streams, requiring bridges of spans varying from 500 to 1,000 feet in length and 700 to 800 feet above the streams, as well as costly rock along the steep cliffs, unavoidable in establishing any practicable gradient.

It therefore being determined to develop a line along the benches and reaching the valley of Lowe River as soon as practicable, I commenced a survey at the summit in order to command to the best advantage the country below. A maximum equated grade of 3 per cent and 100 curves was adopted and the line run on this basis for 12 miles, at which point the smooth flats along the rivers were reached. From here to the harbor a 1 per cent grade or less was easily secured. The character of the line surveyed is as follows: Each mile of the road being called a section, and the sections numbered from the terminal on the bay to a point just beyond the summit. Sections 1 and 2 are located close to the shore line and require heavy work in grading.

The cuts and fills average 10 feet in height. The material would all classify as solid and loose rock, the cuts furnishing most of the material for the fills. The roadbed at this place should be wide enough for a double track, and later additional tracks could be laid as the business of the line may demand. The next 11 miles is practically all tangent and follows up the valley of Lowe River. The work on these sections is all in embankments and extremely light. No fill as deep as 10 feet occurs, and an average embankment of 4 feet places the roadbed safely above the highest flood. The material for making the fill on this stretch of line consists of loose gravel, unlimited in quantity and convenient of access. On section 3 the largest bridge on the line will be required for the crossing of Lowe River. This stream flows from 10,000 to 12,000 cubic feet per second in the high-water season, the volume of water gradually decreasing until late in the fall, when the flow has reduced itself to 300 cubic feet or less per second. In providing for the maximum flow, a bridge consisting of two spans of 200 feet each is recommended. From section 3 to the beginning of section 14 the line is located along the north side of the valley and crosses several side channels of the river.

The flat through which the river runs is fully a mile wide on the average, and here the stream has been accustomed to make its own channels at will, sometimes spreading out in numerous channels and again confining itself to a single passage. The valley is so wide and the drainage basin of Lowe River so comparatively small that the flow of the stream can never cover the entire valley. In a few places dikes should be constructed to guide the water away from the roadbed, where it will soon cut a permanent channel and be no menace to the railroad. The material for the fill should be borrowed from the north side of the line away from the river, leaving a berm or the natural surface of the ground for a distance of 100 feet from the base of the embankment. This will form a channel for all the side drainage in this locality, which will be guided directly to the bay, thus saving any bridges or openings from section 3 to section 14. Sections 14, 15, and 16 are in Keystone Canyon and constitute all the canyon work of the entire line to the summit and for a considerable distance beyond.

In Keystone Canyon the mother rock of the country shows up to good advantage. It is all slate, as is the case with all rock observed on the line. Its cleavage is nearly vertical and easy to drill, except where small seams of quartz exist. The slate rock on the south side of the summit is firm and solid, as a rule, but on the north side it is very much disintegrated. The construction of the line through the 3 miles of Keystone Canyon will be fairly heavy canyon work, somewhat similar to the average of the work through the Black Canyon of Gunnison River, on the Denver and Rio Grande Railway of Colorado. The bed of the canyon varies from 100 to 500 feet in width. There were no marks of very high water in any part of the canyon. In fact, the vegetation growing on the low bottoms, consisting of grass, brush, and trees, indicates that, as a rule, the water does not rise more than 4 feet in nearly the whole length of the canyon.

Keystone Canyon is entered by going through a low pass in a spur divide, which forms the west side of the mouth of the canyon. This shortens the line, saves very sharp curvature, and places the roadbed safe from the wash of the river. The west side of the canyon furnishes the better route to near the head, as the east wall is more abrupt and would require the heaviest character of rock work in order to cut a roadbed along the almost perpendicular slopes. The line, therefore, follows the west side to the head of the canyon, and is located for the most part on the talus formed by the loose rock at the foot of the walls and about 15 feet above low water.

The side-hill or side-wall cuts will make about two-thirds of the fills, the balance of the material being obtained from the gravel bars, which, as a rule, are well above the water line and close to the roadway.

There is but little side drainage to the canyon, and this is easily provided for by small culverts, with the exception of Waterfall Creek, which crosses the line on section 14. This little stream forms a beautiful cascade, with falls of several hundred feet in height, and finally buries itself in the loose rock at the base of the canyon wall. Some 50 feet distant from the line this stream will require a bridge of three 16-foot spans. The profile of the line through the canyon shows short cuts and fills and side-hill work to prevail. For a quarter of a mile about the middle of the canyon, narrows are formed by the side walls being nearer together. Here heavy rock work is essential, and the abrupt walls, from 50 to 75 feet in height, will have to be cut down in order to secure room for the roadbed.

At the head of the canyon the river, dashing against a perpendicular wall of rock, is sharply deflected to the left for 600 feet and then gradually assumes its general direction, which it follows closely to the mouth of the canyon. This abrupt turn in the river necessitates a crossing of the stream, which requires a span of about 150 feet and a sharp cut through a rocky point on the opposite side. The natural abutment on both sides of the stream make this point a favorable one to bridge. Passing on from the head of the canyon a quarter of a mile the river comes in more from the right, and another crossing is made in order to place the line on the smooth part of the valley free from any effect of washing currents, and to get to the best point from which to commence the climb to the summit. By crossing the river at the head of the canyon the light curvature of the line is maintained, and the only point along the route where the snow slides would be troublesome to the maintenance of the line is avoided. On section 17, at the lower end of the upper valley we have now entered, the line is located along the edge of a bluff from 10 to 50 feet in height, composed of gravel and sand, and furnishing an excellent opportunity to cheaply secure what gravel is necessary to ballast the roadbed beyond.

On section 18 a glacier stream is encountered, close to the point where the trans-Alaskan military road makes a crossing by means of a bridge consisting of two spans of 36 and 24 feet, supported on stone-filled cribs, and 10 feet above low water (46). This will require a bridge of 75-foot span for the railroad. As all the bridges on the military road successfully withstood the high water of 1899, this fact is considered of great importance in furnishing data from which to establish the grade line and length of span necessary for the railroad crossing. The light grade so far maintained of 50 feet per mile, or less, ends on section 19, and a heavy grade division begins the climb to the summit. Near the foot of this heavy grade the last glacier stream is crossed (52). This will require a bridge 150 feet long. The grade from here for 2 miles follows closely the military road, then swings to the right along a fairly smooth side hill and approaches closely the outlet of the upper canyon of Lowe River. This part of the line, consisting of sections 19 to 22, inclusive, gives comparatively light side-hill work, the classification in cuts being one-third loose rock, one-fourth solid rock, and the balance pick and shovel work.

On section 22 timber line is reached at an elevation of 1,050 feet above sea level. From this point to the summit the line follows up the benches, making turns on the broad parts of the flat and gradually supporting to the next bench above. All the work from section 22 to section 30 is practically a side-hill excavation, with light cuts and fills, except at the points of swinging onto the flats above, where a few cuts 10 to 20 feet deep and about 200 feet long are unavoidable.

On sections 25, 27, and 30 crossings of a side drainage are made which will require trestles from 50 to 70 feet in height by from 100 to 150 feet in length. These are the highest bridges on the line and can be replaced in the future by culverts, as the drainage basin involved is of limited area, so that no great volume of water has to be provided for. The benches crossed are covered for the most part with a dense growth of alder brush which extends up the sides of the mountain 1,000 feet above timber line. From here to the summit moss and grass are the only vegetation.

From section 30 to Thompson Pass on section 32 the route conforms to the second bench

from the summit, the slope of which is practically that of the grade adopted and consequently a light fill. Easy work as well as curvature is here obtained.

On section 32 the crossing of the sharp ridge of the summit is made with the grade line 126 feet lower than the pass. This necessitates a tunnel from 400 to 500 feet in length and starts the line well on its way down Ptarmigan Creek, a tributary of Tiekell River, one of the principal streams flowing into Copper River from the west.

To find a practicable line from tide water over the summit of the coast range has always been considered the key to the interior country, and this, in connection with a good harbor for all kinds of vessels, is what has heretofore been undiscovered in spite of the earnest and exhaustive search made for the same. Beyond the coast range the interior of Alaska from Thompson Pass has been reported by all explorers as presenting no great obstacles for the location and construction of a railroad line on reasonably light grade, good alignment, and moderate cost of construction.

GAUGE OF RAILROAD.

To reduce the cost of construction on this railroad route to a minimum it is recommended that the line be constructed on a 3-foot gauge. There is no question in Alaska of a connection with other railroads having a different gauge, where transfer of freight is essential. The vital point is to build a good line, first, upon the best location the country affords; secondly, with as little money as possible invested, so that the line can be operated to good advantage and supplies moved at the minimum cost. It is conceded that the paying freights on a narrow-guage line bear a greater percentage to the load moved than is the case on standard-gauge routes. In the grading of the line a narrower roadbed is assured, and this alone makes a vast saving in quantities and cost, while lighter ties and rails will reduce the cost greatly at a time when the facilities for moving freight cheaply to this country and to the inside of Alaska is in its infancy. As the grades and curvature of the line as located are so light, a change could be made later to standard gauge, if desired, without any alteration in the location of the line.

COMPARISON WITH WHITE PASS AND YUKON RAILROAD.

Compared to the narrow-gauge line now in operation from Skagway over White Pass to Lake Bennett, the only railroad now in Alaska, the showing is as follows on a few vital points: Maximum grade on White Pass and Yukon Railway, 206 feet per mile on both sides of pass; maximum grade on Valdez route, 150 feet going north and 125 feet south. Maximum curvature, White Pass and Yukon Railway, 16 degrees; maximum curvature, Valdez route, 10 degrees. Elevation of summit, White Pass and Yukon Railway, 2,880 feet; elevation of summit, Valdez route, 2,550 feet, or 1,700 feet via Marshall Pass.

Besides the above, it is understood that the White Pass and Yukon Railroad is handicapped greatly in its operation by snow slides. On the Valdez route this serious impediment to travel has been practically eliminated by the peculiar formation of the country and the careful placing of the line. The very important condition is also obtained for this country in having a route entirely in United States territory, and thus avoiding all the complications resulting from endeavoring to develop a vast territory full of mineral wealth across 400 miles of foreign soil.

Valdez Harbor and the route via Keystone Canyon to the Divide furnishes the most practicable and economical route for the development of Central Alaska and bids fair to more than hold its own for the freight business of Dawson City and vicinity. With a fine harbor open the year round and a railroad route comparatively free from blockades, built on lighter grades and curvatures than the other route, Valdez may well lay claim to being the main gateway for Alaskan commerce.

BUSINESS.

The trade of Central Alaska is comparatively an unknown quantity at the present time. A greater part of this region has yet to be explored and then prospected. Rumor has always

given this country the reputation of having vast mineral deposits of copper ore, and this is being demonstrated as a fact by the few prospectors and explorers who have examined a small part of this territory.

Gold mining on Forty Mile Creek has assumed quite an importance, and a few recent discoveries of gold south and west of the above-named place indicate that there will be several new gold-mining districts developed in the near future.

The great drainage basin of the Tanana River will be made cheaply accessible, and Copper River, with all of its tributaries, will be brought close to the United States in point of time and cheapness of transportation.

A main line of railway from Valdez to the Yukon will command a large amount of freight now going by other routes and greatly stimulate the settlement and development of a vast country. Branch lines will later be constructed to accommodate the business resulting from the discovery of copper and gold in this highly mineralized section. Discoveries of coal recently made at several points will expedite the work of opening up this region. What discoveries will be made the coming season no one can foretell, but it is my belief that a railway constructed immediately over the route as indicated would have a paying business as soon as it could be opened for travel and freight. Thousands of miles of profitable railway have been built in the United States in less promising regions.

VALUE OF THIS ROUTE TO THE UNITED STATES.

It is of considerable value to this country in having this main route for transportation within its own territory and, consequently, jurisdiction. Some of the many complications which have arisen in the Canadian Northwest Territory will be eliminated and Alaska developed without the hindrance or consent of a foreign country. This deserves our patriotic consideration. Our prospectors will then have an opportunity of getting into the region at the head of the Tanana River and its eastern tributaries and on soil belonging to the United States. With a competent competing route to Dawson, the country concerned would be greatly benefited, and it would aid in the settlement of pending questions with the Canadian government.

STOCK RAISING AND FARMING.

Development of the country in the nature of farming and stock raising depends mainly upon the local market. In many sections of the country hay can be harvested cheaply and in great quantities and all demands of this country in the future can be met by the local production. I have seen quite a variety of vegetables grown here. The soil is exceedingly productive, and I believe that the hardy farmers from Norway and Sweden would succeed in farming here as successfully as in their own country.

WATER.

There is the greatest abundance of pure water everywhere. The streams are filled with trout. Gravity pipe lines can be laid at almost any point desired, quickly securing the necessary fall to fill the water tanks along the railway line and for any other power desired.

TIMBER.

There is an abundance of timber along Prince William Sound, and in the interior sufficient to furnish a good quality of material for ties, bridging, and all wood construction in general. While the trees do not grow to such size as is the case farther south, timber 3 feet in diameter is no unusual occurrence and great forests of a good growth and size for ties extend over a large area in the interior. The nature of the timber is that of the fir, spruce, hemlock, and pine.

COST OF LINE.

GRADING.

2 miles along Valdez Bay, including terminals	$100,000
11 miles along the smooth valley of Lowe River	55,000
3 miles in Keystone Canyon	100,000
3 miles in Dutch Valley	20,000
12 miles to summit along benches	100,000
1 mile crossing summit, including 500-foot tunnel	40,000
Total cost of grading	415,000
Bridging	100,000
32 miles of rails (56 pounds steel per yard), 3,500 tons, at $40, delivered	140,000
90,000 ties, at 33⅓ cents	30,000
For laying tracks, engineering expenses, water tanks, and buildings outside of terminals	68,500
Total cost of line	753,500
or $22,531 per mile.	

The prices here used are from 25 to 50 per cent higher than is the average elsewhere in the United States. Such a line in our western country, built upon a 15-foot roadway on fills and 20 feet in cuts would cost not more than $16,000 per mile. A direct line from Valdez to Fort Egbert, on the Yukon River, is 310 miles long. Allowing 350 miles for the length of the railway would afford all diversion required from a direct line.

The cost of the entire line with equipment, ready for business, will not exceed $20,000 per mile.

THE UPPER TANANA BASIN.

By H. BRIAN PEARSON.

The general outline of the Upper Tanana Basin bears some resemblance to an elongated horseshoe, with the immense glacier at the south end as the toe. The main valley is about 40 miles in length, and it varies from 2 to 7 miles in width, being broadest about 12 miles below the glacier and narrowest at its lower end. It is surrounded by mountains in every direction, except toward the north, where a view of the course of the Tanana for 70 miles can be obtained, the river winding through heavily-wooded foothills in that direction.

Of the valley space, from about one-sixth to one-third is taken up by the river, a large body of water of glacial origin heading in an immense glacier at the head of the valley. It has a very wide bottom and is divided into numerous shallows, with a current of about 7 miles an hour, occasionally cutting into its timbered banks and leaving the original bottom nearly dry. The remainder of the valley space is occupied by foothills of glacial débris, and in some instances country rock. Very few swamps of any extent exist, the valley having a fairly good drainage, and the tributary streams generally consisting of merely rocky torrents which cut through deep-box canyons. The mountain ranges decrease in altitude toward the north and increase toward the south until their highest point is reached. This point appears to be the Wrangell group, which comprises three distinct spurs and which are discernible from the Tanana range. On the east side of the river the range is a series of ragged precipitous peaks, like the teeth of a saw, and to all appearance no pass exists over them for 30 miles below the glacier. On the west side the mountains are of the dome-shaped and sugar-loaf variety, having many terraced slopes and are crossed by passes at numerous points.

GENERAL GEOLOGICAL FEATURES.

The general formation tends southeast to northwest, having a dip of about 20° to the northeast. It is composed of limes of the Upper Silurian and Lower Carboniferous groups, the west side having an unconformable capping of basalt, and on the east side a similar capping of white marble. That volcanic action has been prevalent to a large extent is evinced by the large number

of contortions and faults existing in the formations. The country is traversed by a number of dikes of intrusive granite, dolerite and porphyry, the last named heavily impregnated with the sulphides of iron, copper, molybdenium, and in some instances lead. Native copper is found in stringers and also in the creek bottoms as float; also small pieces of coal of the lignitic variety.

The country is heavily timbered with spruce, cottonwood, birch, balm of gilead, and the quaking aspen. The spruce is of exceptionally good quality for the interior, trees of a diameter of 18 inches being fairly common. During the last summer a number of boats were built in this vicinity by prospectors and by them taken down the rivers. Grass is abundant, generally of the redtop variety, and exists in patches of 40 acres or upward. This grass grows to an average height of 15 inches. Wild berries of various kinds are common, of which are: Currants, red and black; blueberries, raspberries, dewberries, cranberries, and on the mountain side crowberries.

MAMMALS, ETC.

Fox, caribou, moose, bear, cinnamon and silver tip, beaver, and porcupine are met with, while sheep of the big-horn variety are plentiful. Sheep in flocks of 50 are not uncommon. Fish are plentiful in clear-water streams, trout and grayling being most commonly met with. The salmon do not run down to the Tanana headwaters. Ptarmigan are plentiful in the winter and spring, Canadian grouse and pheasant during the summer months. The moor duck, mallard, and grebe, also geese, can be found nesting about every lake.

AGRICULTURAL.

Potatoes, beets, turnips, radishes, and onions, of the hardy varieties would thrive. Of the cereals—oats, rye, and probably Russian wheat, would do well.

SKETCH OF TRAIL.

TRAIL VIA BACKENEDA CREEK TO THE MAIN TANANA.

Leaving the old trail at Cache Creek, at the point where Lieutenant Lowe left a cache in 1898, and following the foothills of Mount Sanford in a northeasterly direction, the trail proceeds through scattering timber, and at a distance of 10 miles crosses a clear-water stream some 20 feet wide. Keeping between Cornwall ridge and the foothills, and retaining the same course, the trail crosses a rapid glacial stream 2 feet deep, at a distance of 9 miles.

Between Cache Creek and the glacier stream the trail passes several small trails on the right and left hand sides. About 2 miles beyond the glacier stream the trail descends toward the Copper River, which at this point is visible, as is also a gap in the Suslota Range. Bearing N., 80° E., and striking the Copper River at a point about 80 miles above the Slahna River, the trail crosses the stream on a gravel bottom, making an easy ford. It then bears east for a mile and strikes the regular Indian trail at the mouth of Backeneda Creek. It now follows the creek for 2 miles and crosses at the house of John, an Indian chief of that district. At this point you follow the opposite bank for 4 miles, when the trail turns to the right and up a bench 150 feet high. Following this bench for 4 miles the trail forks. The right fork leads to the headwaters of the Copper River, and the left leads to Lake Tanada, the source of the Backeneda, now distant 15 miles. Fording the Backeneda at the foot of the lake, the trail forks again—the one on the right running to the head of Lake Tanada and the one on the left to the West Fork of the Tanana.

The one on the left, after bearing due north for 2 miles, passes another lake on the left, then turns east and follows the valley about 10 miles to a third lake. This lake drains into the Tanana watershed. Passing down the right of this lake and following down the valley, the Tanana is struck 5 miles below the West Fork.

NOTES.

This trail, after turning into the Copper River bottom, is heavily wooded for its entire length, the spruce timber averaging 15 inches in diameter. There is an abundance of food for

horses everywhere during the summer months. At Chief John's house, on the Backeneda, is a patch of over 40 acres of the finest hay land, and at Lake Tanada and the surrounding country any required amount of hay can be cut. Very little, if any, swamp land has to be traversed, and comparatively no declivities to ascend or descend. The Tanana, at the point where this trail strikes it, is fordable for horses.

TRAIL TO WEST FORK OF TANANA VIA LAKE TANADA.

This trail forks to the right from the main Tanana trail at the foot of Lake Tanada, following the lake to its head. It then goes south for 10 miles to a fork. The left fork leads over a low divide and strikes the river about 7 miles above its junction with the main stream. The right fork continues in the same general direction, and, passing a series of small lakes, strikes the river at the junction of the two glacial streams which form its bed. This trail can be used for pack horses, and it is an easy route to the glaciers and country. Immediately at the Tanana headwaters there is a fair amount of timber up to within 10 miles of the glacier, at which point it becomes scrubby and scattering.

TRAIL TO TANANA GLACIER VIA COPPER RIVER.

As you leave the main Tanana trail, at a point where the trail forks, 8 miles above Chief John's house, you travel south to another Indian house at the foot of Lake Zocneda. You cross this creek at the foot of the lake and follow the trail around the right side of the mountain to a small fork of the Copper River. Seven miles from the Zocneda ford is a cache built in 1898 by Roberts & Co. Continuing up this creek for 7 miles, the trail forks, the right fork leading to the Copper River glacier, distant 8 miles.

The left fork twines up a gulch to the east and passes through a box canyon, crossing the divide at the head of the canyon summit. The summit is 7 miles distant from the fork. The corresponding canyon on the other side of the west fork of the Tanana is 9 miles from the summit. From this point the trail continues to the main river. By crossing the stream, easily fordable with horses, and taking the trail up a gulch due east you follow the trail to the divide, which is a distance of 8 miles. At this point you continue down the canyon, leaving the small lake on the summit to the left, and proceed to the main river, 9 miles distant. On the east bank of the Tanana is a cache which can be easily distinguished. The river is fordable at this point and flows over a gravel bottom. It is not fordable above.

This trail is serviceable as a short and direct route to the headwaters of the Copper River and the Tanana. There is no timber on the divide or above the canyon. Pack horses can be used, but they should not be heavily laden on account of the steep grades of the ascents and descents of the divides.

Branching from the main trail at Chief John's house and bearing due north is the trail that keeps to high ground. It crosses the Suslota 6 miles above its mouth and keeps along the foothills, following the Slahna River to its junction with Mentasta Creek. At this point it joins the trail up the Slahna River, keeps to the right of the lake and then follows the bluff to its head, when it strikes the Mentasta Pass trail.

This is an old Indian trail, formerly extensively used. It is dry the whole of its course, with the exception of the immediate bed of the Suslota and for 1 mile below its junction with the Mentasta Creek.

GEOLOGY OF WRANGELL MOUNTAINS.

By OSCAR ROHN.

The structural problems presented by the Wrangell Mountains are necessarily too complicated to permit of being solved, even in a general way, in the limited time and opportunity which I had at my disposal. Particularly at this time, when I have had no opportunity to study the specimens and fossils which I was able to collect, all that I can offer is a review of my field observations, hoping that they may be of some use as a preliminary to further work.

Northward from the Lowe River Valley, the rocks of which were examined and reported

upon by Schrader, the conditions there existing continued to about as far as the divide at the head of Quartz Creek. Here were seen the first signs of volcanic intrusives and the nature of the rock was found to change to that of a series of micaceous and quartzose schists, probably corresponding to what Schrader has named the Klutena series. The contact between these two series is approximately east and west and crosses the valley of the Kanata below the mouths of the Ernestine and Fall creeks. The effect of the change in the rock formation upon the topography is very marked. The forms become much less jagged and more rounded and regular.

The range north of the Tonsena River, so far as examined, was composed of volcanic diabases. Judging by the irregular arrangement and the similarity in irregular and much rounded forms it is probable that most of the range is of volcanic origin.

At the head of the Kotsena River are found a series of very regular, nearly horizontally banded rocks, indicating in every respect bedded rock of sedimentary origin. The absence of any sign of sedimentary rocks in the bed of the river led me to climb the mountains to examine these rocks, and, to my surprise, I found them to be amygdaloidal, volcanic diabases, much resembling the old diabases of the Keweenawan area of Lake Superior. These regularly bedded diabases were seen to extend across the valley to the northward, but in the valley beyond they become highly inclined and very irregular. They dip at first very lightly to the southwest, but westward the dip becomes more and more steep, and about 2 miles from the foot of the glacier the bedding becomes highly inclined and irregular, and these rocks dip under overlying formations. The northern fork was followed for a distance of about 4 miles, through a wide canyon to the foot of the glacier which it heads in. The walls of this canyon consist of much decomposed and brecciated volcanic rocks. Just at the foot of the glacier there is a heavy ledge, probably a dike of greenish diabase, which is thoroughly impregnated with iron pyrite. The iron oxide, due to the decomposition of this pyrite, stains the mountain side for a distance of several miles on the westerly side of the glacier. On the surface of this glacier I found specimens of obsidian, and very vessicular lava, both red and black, and large blocks of a very regularly bedded volcanic ash. Dikes of acid volcanics are very common. In a felsitic mass near the foot of this glacier the "flow structure" was very marked. In one dike of a very light-colored acid rock the crevices were filled with sulphur and cinnabar.

About a mile below the forks, on the northern side, was a mountain, very smooth and regular in outline, entirely different from those surrounding it. Examination showed this to be composed of a granitic porphyry, which disintegrated so readily that the entire mountain side was one talus slope. This porphyry dips under the surrounding rock on all sides, and on the eastern side, where the contact was observable, it was seen to send out dikes and outlyers, which became finer in grain and redder in appearance as they receded from the main mass. The porphyry is probably a boss, and may readily be the source of a great number of acid dikes seen to the eastward at the foot of the glacier. To the westward of this granitic mass the diabases again appear, but the bedding is here not marked and, near the confluence of the second northern branch of the river, they dip under sedimentary rocks at an angle of about 45°. These sedimentaries are much disturbed and fractured sandstones and shales, very much seamed by calcitic and quartzitic veinlets. The rocks are here so disturbed and so irregular that no general dip or strike could be determined. Below the third fork, however, a very heavy bed of conglomerate appears, and this strikes in a direction nearly northwest to southeast and dips southwestward at an angle of 30°. The pebbles in this conglomerate, so far as examined, were those of sedimentary rock, mostly of the shales and sandstones just described. They were clearly waterworn and were nowhere found much affected by stretching and flowage. To the westward of this conglomerate the valley widens and I was unable to examine the rocks; but the more regular features of the mountains would tend to indicate a series of less disturbed sedimentary rocks, dipped in a general southwesterly direction.

Between the foot of these mountains and the Copper River are a series of low ridges, trending in a general north and south direction and mainly composed of basic volcanic rocks. The Kotsena River runs parallel to these ridges far to the southward, where it crosses them through narrow canyons.

Rocks are exposed in many places along the Chettyna River and the country to the northward. Between the Chettyna and the mountains is a rolling hummocky area, in which small lakes and low-rounded rocky ridges are very numerous. The trend of these ridges is approximately east and west. So far as observed, the rocks of both the river and the valley northward seemed to be mostly of sedimentary origin, very much affected by dynamic action. They were so much folded and displaced that the dip and strike could not be made out. One rather elevated mound, just west of the point where the trail leaves the bank of the river, is composed of a rock resembling to a very marked degree the Magnetite Actinolite Schist of the Huronianic. Local magnetic attraction was very marked, not only on this hill, but throughout the valley.

The mountains bordering the valley on the north are very regular in outline, and by their uniformity in appearance would seem to indicate uniform structure. Where they were cut by the valley of the Kuskulana, the first of these is composed of hard ringing, highly silicified grits, shales, slates, and some schists, all of which are seamed in three or more directions by veinlets of quartz and calcite. On the second creek, entering the Kuskulana from the west, I found a bowlder containing fossils, some of which may prove sufficiently characteristic to indicate the approximate age of these rocks. Northward, along the valley of the Kuskulana, the outlines of the mountain change very rapidly. On either side of the pass by which we left the valley are high peaks with smooth regular outlines and a few gulches, features characteristic of the granitic porphyry peaks of the area. Several of these were seen to the northward, and between them were exceedingly ragged craggy peaks, showing the marked bedding, inclined sometimes in one direction and sometimes in another, and nowhere sufficiently regular to indicate a general dip and strike. From their resemblance to the bedded rocks at the head of the Kotsena, only a few miles distant from this point, I took them to be similar and of volcanic origin. This is made more probable by the great amount of volcanic rock found in the bed of the river at the foot of the glacier.

On the eastern side of the porphyry peak to the south of the pass by which we left the Kuskulana, I found a contact between the porphyry and an arkose or very impure sandstone. I was unable to determine whether the volcanic was intruded or the sandstone laid conformably upon it. Fossils collected from this sandstone may indicate its age. Eastward the same general conditions seem to prevail. The broad open valley which we followed is bounded on the south by a group of mountains, probably composed, in a large measure, of sedimentary rocks, such as we found on first entering the valley of the Kuskulana. These, on their northern side, show the effect of volcanic disturbance. Along the valley mounds of granitic porphyry are frequent, and the entire range to the north shows the exceedingly ragged craggy outline characteristic of the peaks at the foot of Mount Blackburn, both at the head of the Kotsena and the Kuskulana, and everywhere showing evidences of the irregular bedding there noted.

To the northeast of the bend in the Lachena is one of these granitic boss-like mounds, in which the rock has a decidedly younger appearance than that found farther west. Another one of these acid mounds occurs to the north of the pass from the Lachena to Root's glacier. Just beyond this, northward, is a flat mesa top, the edge of which, seen in the vertical wall of an amphitheater at the head of a small valley, shows a series of very regularly bedded rocks that can hardly be other than of sedimentary origin. The bedding is, however, no more regular than that which, at the head of the Kotsena, was found to exist in volcanic rocks. It was impossible to reach this exposure and determine its true nature. Photographs were taken which show the bedding most beautifully.

To the south of the pass the mountains are very ragged and irregular, and present irregular babs of very light-colored material alternating with others which are very dark and may be either sedimentary or volcanic. In all probability they are beds of both volcanic and of sedimentary origin.

An isolated peak between the two great lobes of Root's glacier shows the contact of a light-colored bedded rock, striking approximately northwest and southeast and dipping northeast at about 30°, overlying a dark-colored massive rock. This contact was traced in the mountains, both to the west and to the east of the glacier. It was again seen not only in both walls of

McCarthy Creek, but also in both sides of the upper Nezena Canyon. It was impossible to reach the mountain in the forks of the glacier; but on McCarthy Creek the heavy-bedded formation was found to be a dark-bluish exceedingly compact limestone bed from 500 to 1,000 feet thick. Where first observed it was very regular and little disturbed, but in the range between McCarthy Creek and the Nezena River it was found to be much contorted, fractured, and folded. In the western wall of the upper Nezena Canyon it shows great faulting and a completely recumbent fold, which was noted by Dr. Hayes. The rock underlying this limestone was found to be a greenish, heavy, amygdaloidal diabase. It is in this diabase that the Nicolai copper vein is found on Nicolai Creek, between McCarthy Creek and the Nazena River. The vein is formed in a fault plane near the contact between the diabase and the limestone, which is very much fractured and disturbed. The contact between these two series of rocks which appears in the mountain between the forks of Root's glacier is beautifully shown in a number of photographs taken westward from the glacier and marked 18–2, 3, 4, and 5, and in the mountains east of the Nezena it is shown by 21–2 and 3, while 21–5, 6, 7, and 9 show folds in the limestone on the western side of the Nezena. While locally disturbed, as noted, this contact shows a very persistent strike and dip.

In the range between McCarthy Creek and the Nezena River there was found to the northward of the limestone, and seemingly conformably upon it, a great thickness of thickly-bedded very much folded shale and slate. The effect of this upon the topography is very marked. The mountains composed of this rock are characterized by regular pyramidal outlines with few gulches. They are beautifully illustrated in the views numbered 19–3, 4, and 5. From the same peak on which these were taken, east of the head of McCarthy Creek, photographs numbered 19–7, 8, and 9 beautifully illustrate the bedding in the range to the northwest. At the very top of this peak a conglomerate is found upon the shale which grades upward into an impure sandstone similar to that which is found unformably in the truncated limestone and volcanics in the western wall of the Nezena Canyon, opposite Nicolai Creek. At this point the mountains present a flat mesa-like top, covered with this later sandstone. The succession, therefore, seems to be a series of old amygdaloidal diabases. Upon these a great thickness of limestone, shales, slates, and sandstone, and unconformably upon this recent sandstone, which in turn seems to be overlain to the north by more recent volcanics. Dr. Hayes suggests that this limestone is probably of a Carboniferous age. The later sandstone here found resembles that found just east of the Kuskulana. Fossils were found at both of these points, and it is hoped that they may prove sufficiently characteristic to determine the age of the sandstone. The mountains to the south of the exposures of limestones and diabases are composed of light-colored, often reddish, rocks, which may be the continuation of the sandstones and later sedimentaries, or they may be, in large part, intrusive volcanics, possibly both.

In the ridge immediately west of the foot of the Nezena Glacier were found exposures of a diabase amygdaloidal volcanic, similar to that just described farther south. This was, however, much faulted and folded, and its occurrence at this point may be due to displacement. Northward, and beginning in the ridge between the two western lobes of the glacier, are a series of light-colored, more or less crystalline, recent volcanics. These rocks seem always to be more or less bedded, and constitute almost the only material carried in the moraine of the glacier, both on the northerly and southerly side of the summit. It may be that it is such rocks as these that constitute the bedded rocks noted in the high range from Mount Blackburn east. On the northern side of the glacier, about 7 or 8 miles from the summit, the younger amygdaloidal diabases begin to appear, but the mountain immediately north of the foot of the glacier is made up of very recent, exceedingly vessicular lavas, of both a very dark and a bright red color. This mountain presents the bedded appearance and the peculiar jagged topography noted in several peaks on the summit, and is beautifully illustrated in plates 23–1. Beyond the valley, northward from the foot of the glacier, is a range of very jagged mountains, suggesting even at a distance highly inclined, much disturbed bedded rocks. So far as I was able to observe them, these rocks were found to be of sedimentary origin. Eastward this valley shows low, mesa-topped hills, suggesting the same origin as the one noted just north of the foot

of the glacier. To the westward the valley narrows into a gulch leading to the Nabesna. To the south of the head of this gulch is a mound of granitic porphyry, similar to that described on the Chettyna side.

About 3 miles down this gulch volcanic rocks more or less amygdaloidal, and older than those noted farther east, are found mingling with and more or less replacing the sedimentaries.

The general direction of the contact between the sedimentaries and the volcanics seems to be somewhat north of west. From here on I had no opportunity whatever to examine the rocks, but the form of the mountains in the Mentasta Range (144) suggests that these probably present a continuation of the conditions existing in their southern extension, while the mountains in the direction of Mount Sanford have the jagged, bedded appearance which characterizes the later bedded volcanics near the glacier.

It appears, therefore, that the rocks of the area comprise a series of sedimentary formations ranging in age from the Carboniferous to a very recent time, all more or less disturbed and displaced by earth movements and by volcanic rocks, ranging from old diabases and granitic porphyries to the most recent lavas.

GLACIERS.

Owing to the fact that the Wrangell Mountains are among the highest on the continent and that the low coast mountains south of them, together with the Copper River Valley, admit the moisture-laden winds from the coast, they present the heaviest glaciation of any area in Alaska equally distant from the coast. Mount Wrangell, a huge, smooth, dome-shaped mountain, is covered by one vast snow field which extends northward along the divide over both Drum and Sanford, and southward not only over Blackburn, but the entire high range east of it. This great snow field gives rise to the innumerable glaciers covering the valleys leading away from it. The largest of these glaciers is found east of Mount Regal, where it gives rise on one side to the Nezena River and on the other to the Tanana. On the Nezena side this glacier is composed of three great lobes, one of which rises at the foot of Mount Regal and flows directly east and the other two cross the range to the north and again join lower down and form the Tanana Glacier. At the summit this presents one great field of snow and ice, through which isolated peaks project. Their southern faces are usually bare and their northern slopes covered with a great mass of snow. The summit of the western lobe, which we crossed, is over 8,000 feet above the sea. On the Nezena side the foot of the glacier is heavily moraine-covered and shows considerable activity. On the Tanana end, however, it is free from moraines and presents the smooth (137, 138), rounded appearance characteristic of a receding glacier.

Westward from the Nezena Glacier, and beyond two small glaciers at the head of the western branch of the Nezena and of McCarthy Creek, is a many-lobed glacier draining the entire range between Mount Regal and Mount Blackburn, and extending far out upon the plain below. This has been named in honor of Secretary of War Root. This is, next to the Nezena, the largest glacier of the entire area. The stream which drains this area rises to the surface as a huge spring beyond the foot of the moraine. The drainage on the southerly and westerly side of Mount Blackburn gathers into the Kuskulana Glacier. To the westward of Blackburn and Wrangell the glaciers are smaller and give rise to numerous streams which carry the drainage of this area to the Copper River. Northward from Wrangell a lobe finds its way into the Sanford. The eastern side of Wrangell and the southern side of the range east of Blackburn undoubtedly contain some large glaciers, as shown by the nature of the Nabesna River, to which they give rise. These, however, were not seen.

A TRIP TO WOODS CANYON.

By EDWARD CASHMAN.

In my trip to Woods Canyon after thirteen horses I met with some adventures which may be read with interest. I left Valdez October 18. With me were four companions. We camped at what is known as Dutch Camp, on the Lowe River, the first day, and found the trail leading

to that point very good. The third day of our journey we encountered a huge bear. We shouted at him and he ran up a bluff. Soon, however, he came running down a stream near by, and we started to run. I was in front and had the only weapon in the crowd, a small hand hatchet. We ran as fast as we could for 50 yards, when on looking back we saw the bear running the other way. While going through the pass a short time later we saw another bear seated on a rock, but he did not trouble us. We arrived at the banks of a large river at 1 o'clock. We camped for the rest of the day and looked for some flour which the soldiers told us was there. We could find none, and the next day broke camp at 8 o'clock. We went down the valley about 2 miles and started through a small canyon to our left. In going through the canyon we broke through the ice several times, my boots getting full of water, and when we got through the canyon we found a small glacier. It took us from 11 until 4 o'clock to cross it. We traveled through 2 feet of snow. It was snowing all the time. When we got off the glacier we found ourselves in a small valley. We could not go any farther, as it was dark. We walked around a large rock all night. We started at daylight and at 10 o'clock we found some wood. We built a fire to thaw ourselves out. It took half an hour to get my boots off and I found all the toes of my left foot and the big toe of my right foot frozen. I rubbed my toes with snow and then started down the valley. It commenced to snow and we could not see 10 yards ahead of us. We traveled for four and one-half hours and came back to our camp fire again. About this time we came to the conclusion we were lost.

In the morning we climbed the mountain, but could not see on account of the weather. We lost several days in that way. One clear day while I was up the side of the mountain I saw a large lake. I told the rest of my companions we had better go to the lake and we would find out where we were. We started down a stream which came from a glacier. We crossed and followed it for several days. We walked on the ice, as the stream was freezing up. Streams freeze from the bottom and then from the side. In going down the stream we saw the tracks of bear and wolverine in the snow. We also saw tracks where the bear had been fishing for salmon. Both stream and lake were full of large salmon. We saw nine bears in the woods. It took us one day to walk around the lake, when I struck a trail which I recognized as the Quartz Creek trail. We were so weak at this time that we could hardly travel. When I told the boys we could get to the rapids in a day, it braced them up; but it took us a day and a half to get there. When we arrived at the camp the people could not do enough for us. Through the kindness of Dr. Townsend, who doctored my toes, and Mr. Fishline, who gave us provisions, we were soon on our feet again. My companions stopped here and I left for Copper Center. We were eight days without a thing to eat. We saw 11 bears. It took us eleven days to make the trip. I could do it over again in four days. We kept walking too much to the northwest. It is my opinion a good trail can be made to Copper River via Lowe River.

I left Copper Center November 1, with Jack Stewart and Joe Ham. We were two days getting to Nicolai's No. 2's wigwam. We stopped there about two hours. We left Copper Center Monday. The Copper River was full of slush ice. Wednesday we stopped at the mouth of the Kotsena River to deliver a letter to Mr. Fritz, who was wintering 12 head of horses there. We had a hard time on account of the cold and ice. Friday we were caught in the ice jam. Our boat was lifted 8 feet in the air. We had to take the seats out of the boat and use them like snowshoes to get to a shoal about 100 yards from us, as the ice was not solid enough to hold us. We camped on the shoal, and about 3 o'clock next morning we were awakened by the ice moving. We were like rats in a trap. Our boat was gone and the ice was moving all around us. It piled up, cake on top of cake, until it was almost 15 feet high in the middle of the river. It was forced up on the shoal and stopped within 3 feet of our tent. At daylight the ice had stopped moving and was frozen solid enough for us to move on. Some Indians came over and helped us to pack what was left of our goods to the bank of the river. We were almost opposite the Kotsena River. It took us until Monday morning to pack our goods to where we found the horses. We found them on a bluff. They had eaten everything, even the trees as far up as they could reach. We found 9 alive and 3 dead. One of the live ones was down on the river flats and it looked as if he had tumbled down the side of the bluff. One of his forward legs was

broken and a piece of his tongue was hanging out of his mouth. We shot him. Stewart and I left Ham to watch the horses, and started down Wood Canyon to find a place to cross over to Taral. The Copper River was about 1 mile above.

The Chettyna was open as far as we could see. I found a place where the broken ice had made a small jam, over which we crossed to Taral, where we found the "Old Klutch" and a buck. We asked them for the saddles; they thought we meant Seattle. They could savy San Francisco and Seattle, but did not know what "saddles" meant. As the owner of the cache was not at home we had to wait. We started to recross the Chettyna, when we found that the ice jam had disappeared. On invitation we went into the shack where we were treated in good style. The "Old Klutch" brought out her chinaware and gave us beans, fruit, bacon, tea, sugar, and lard in place of butter, also baking-powder bread. We also had boiled salmon. The "Old Klutch," in honor of having white men in her shack, put on her best sack, which was made out of a red handkerchief. She was prouder of that and her chinaware than white women are of their seal skins and silverware. We slept that night on the floor, rolled up in a moose skin, alongside of "Old Klutch." In the morning for breakfast we had beans, tea berries, and a piece of bacon. After breakfast "Old Klutch" took our platter, from which we had eaten the beans, and licked it clean with her tongue. She then boiled some salmon and had her own breakfast. She offered us some, but we refused to accept. When we were ready to start she fell all over herself trying to thank us for sleeping in her house. She said, "Tanks, tanks! White man hi you; you good white men sleep here," etc. She was tickled all over to have us sleep there, as she considered it quite an honor. She would not let us thank her or give her anything.

We had to go down about 3 miles from Taral in Wood Canyon before we found a place to recross the Chettyna. We showed the Indian the riding saddle we had, and then he knew what we meant by "saddle." This was the first time this Indian ever saw a horse. He saw the horse we shot and wanted to know if we would "pot latch him" the skin. I let him have my knife to skin the dead horse with. The Indian stopped with us that night, but not very willingly, as for some reason Indians do not like to cross to this side of the river. We helped him to pack the horse skin, and by the time we had arrived at Taral another Indian had come from Chettyna. As we bade the Indians good-bye they wanted to know which way we were going. We told them down to the Tasnuna. They told us we could not go there, as it was "hi you rock and five sleep." They would not take anything from us, as they thought we did not have enough for ourselves. They gave us to understand that if we were short of grub to come back to them and they would supply us. They said: "White man ha-low muck-a-muck. One moon hi-you cold white man no muck-a-muck. Indian pot latch hi-you muck-a-muck. In one moon hi-you cold, hi-you wind, white man die," which we found pretty near right. We had a hard job to catch the horses, as they were half wild. We built a rope corral and got them into it, but they broke through three times. We then felled trees and built a log corral and got them into it. We had to drive them into a corner and pile logs around them before we could get the halters on. After putting on the halters we had no more trouble except with one horse, which was a kicker. We then started down the river over the ice, but the horses could not walk on it. They kept breaking through and slipping down. We started over the hills, but after ten days' hard traveling we had to turn around and come back, as the country was full of canyons running at right angles to Wood Canyon.

About this time all our supplies were gone except one pot of beans. We used to stay up at night to do our cooking, as the days were so short we did not have time to cook. It became dark about half past 2 and light at about half past 8. We cooked the last pot of beans one night and the next morning we put them on the fire to warm. Every night we would secure a rope between two trees and then tie the horses on each side near the fire. When you pulled the halter of one of the horses he would pull back, and once the horse pulled back and dropped down on top of the fire and our beans. We could not get him up and had to pull the fire out from under him. He was badly burned around the legs. We lost our beans and had to go hungry all that day and the next until we came to an Indian shack, where they gave us salmon and tea. They did not have anything else. We slept in the shack. In going up the hill at Wood Canyon

the horse which had kicked us was going up the trail by himself when his pack caught in the roots of a fallen tree and tripped him over on his back. He rolled over and over like a rubber ball. We heard him coming and had to hustle to keep out of his way. He went by us like a shot, heels over head. We thought he would be badly injured and took a gun down to shoot him, but when we arrived at the foot of the hill he was standing up drinking at a hole in the ice, his pack on, and not a scratch on him. The weather at this time was very cold and growing colder every moment. Our fingers and faces were frost-bitten. About this time the horses commenced to give out. They would lie down and not get up. We lifted one up four times, but he could not go over 50 yards before he would drop again. We were compelled to shoot four of them in one day. One broke through the ice and we were obliged to go back about a mile and a half to an Indian shack to get an ax to cut the ice around him. We hitched two horses to him and pulled him out. Just as he got out he froze up as hard as a rock. The Indians up this part of the river were short of grub. They would feed us, but we could not buy or trade with them for grub. We cut the horse up and lived on him for four days until we arrived at the Kotsena, where Mr. Fritz made us stop for two days to rest and thaw out. He told us it was 35° and 40° below zero. We had three horses and a mule, but had to shoot one of the horses here, as it could go no farther.

Mr. Fritz treated us very kindly, giving us all the flour he could spare. He was short himself, and as his cache was at Copper Center he could not give us much. We had lost all track of time. He told us it was about a week before Thanksgiving. We left there with two horses and the mule. We packed our grub on the horse that kicked us and our bedding on the remaining horse and the mule. The first day in going down a hill from the Kotsena, Stewart led the horse halfway down the hill, when the mule slipped and rolled down on top of him, knocking him and the horse over, and all three rolled to the bottom of the hill together, without damage. The other horse, which we called the kicker, on account of his kicking at us at every opportunity, turned and ran back on the trail, scattering our grub and what was left of the horse meat. I ran back and headed him off three times, but he dodged me and got away. I found afterwards that he went back to Mr. Fritz's place about a week afterwards, and that Mr. Fritz cut the saddle off him and turned him loose. We found most of our grub. The horse meat we could not find. It was a very cold day and the night was much colder. We made Nicolai No. 2's house at dark and were very glad to sleep there. We slept in the storehouse. We did not need our blankets, as it was so hot we had to strip to our underclothes. The next day it was very cold and at night we camped at an abandoned Indian shack. When we stopped we were so cold we could hardly light a fire. I could not speak, as my mustache and whiskers were frozen solid, and as my mouth was open I could not say anything until we started a fire and thawed out. I will say right here that whiskers are a nuisance in this country. The next day we had nothing to eat except two flapjacks—one apiece—made of flour and water. At night we built a big fire. It was so cold we did not go to sleep, being afraid we would freeze. We had eight large trees ablaze. I froze my heels.

The next day we had one-half of a flapjack apiece, and only flour left for another in the morning. The night was colder than the previous one. We built two fires and stood between them. Along about 4 o'clock in the morning we were half asleep when we heard a noise in the camp outfit and looked out just in time to see the mule eating the last of our flour. We got nothing to eat for the next two days until we came to Stickwan's house. The Indians at this shack could not do enough for us. All they had was dried salmon and tea. They gave us all we could eat. They even tried to get the horses into the shack. They measured their doors and then the horses to see whether they could bring them in, but as you have to crawl into their dwellings on your hands and feet, it was impossible to get the horses in. We asked them how far it was to Copper Center. They said "Hi-low sleep," meaning we could make it in less than a day. We were very glad of it, as we were knocked out and the horses were in very poor condition. We arrived opposite Copper Center at 4 o'clock Thanksgiving Eve. We were obliged to leave the horses, as the Klutena River ice would not hold them. As it was, when we crossed, we broke through several times, and then had to go up Copper River. When we got to Mr. Amy's cabin he

could not believe it was us, as he told us it was over 65° below zero the last three nights when we stood around the camp fire. We were so hungry we ate supper at Mr. Amy's cabin, then went to Mr. Fisher's cabin and had another good supper. We still felt empty, so we went to the hotel and had another supper. Notwithstanding this we still felt hungry. The next day, Thanksgiving (and we felt thankful, too), we brought the horses over and left them in charge of Mr. Flynn. We then started for the Rapids Camp, at which place we arrived at 5.30 p. m. As our cache was at the Rapids we stopped for four days and filled up on all the good things we had to eat. We then started over to the glacier after some grain. It took us two days to get to Twelve-Mile Camp, at the foot of the glacier. The Klutena Lake was frozen over. From the upper end of the lake to Twelve-Mile we broke trail on snowshoes. The snow varied from 1 inch to 12 inches in depth.

When we arrived at Twelve-Mile Camp the snow was so soft we would sink up to our hips every step we took. We stopped at the Sawmill Camp for dinner. As we had broken through the ice in the upper river our moccasins were wet and frozen. They thawed out while we ate dinner. In going from the Sawmill to Twelve-Mile Camp, a distance of 3 miles, Stewart froze the bottom of his feet so badly he could not move the next day. The people at the camp were very glad to see us. They heard we had gone down for the horses, and as the weather was so cold and stormy they did not expect to see us again. I stopped with a Mr. Nolan, of Jefferson City, Mo., who treated me very kindly and cautioned us not to go over the glacier. He showed us a Norwegian by the name of Evyan who had frozen his feet in trying to cross. When Dr. Logan came in he advised us not to try to go over the glacier, as it was stormy and cold. The doctor treated Stewart's feet. The next day I started to go to the foot of the glacier, a distance of about 4 miles. It took me four hours to go about 200 yards. The snow was 14 feet deep and very light and dry. I would sink up to my waist at every step.

When I returned to camp Dr. Logan told me that he would not allow us to make a second attempt, if he had to watch us himself. That night Evyan died. I was sleeping alongside of him. The next day Stewart and I hit the back trail, as we were afraid of getting caught in a snowstorm. Every snowstorm averaged 3 or 4 feet in depth. It was well we started at the time we did, as the next day it commenced snowing and it was a week before anyone could get from the Sawmill to the Twelve-Mile. We went back to the Rapids, where we moved our cache to Copper Center. Christmas Day I parted with Stewart, who started for Forty-Mile. I stopped at Copper Center for a time, and helped a friend up as far as the Gakona River with his outfit. The weather at Christmas time averaged 35° below zero at Copper Center. While I was up the river in January it dropped to 55° or 60°. I froze my fingers and feet again. When I left Copper Center February 1 there were quite a number of men sick in the hospitals and cabins. It took me five days to get to Valdez. I spent one night on the glacier at the "fourth bench." The next morning I left the "fourth bench" at 8 o'clock in a snowstorm. It was 6 o'clock when I arrived at Valdez.

The Indians whom we met down the river treated us kindly. They would come out 3 or 4 miles to meet us and invite us to their houses, where they would share their food with us. They make excellent tea by mixing a native leaf with English breakfast tea. They make their tobacco by rolling a piece of gunny sack in wood ashes. They prefer this to our tobacco. Whenever we went to their houses they would seat us close to the fire and look us over. If our mittens or moccasins were torn they would take them from us and repair them. Stewart's moccasins, which were worn out, were replaced by a new pair, made of moose hide in half an hour by a Klutch woman, who would take no pay from him. She seemed very happy, however, when I gave her a large safety pin, such as we use in fastening horse blankets. Another night, after they had repaired our stockings and mittens, I showed one of the Klutchers where Stewart's pants were torn at the fork. She wanted him to take them off so that she could fix them, but he was bashful and would not do so. Before he realized it, two Klutchers caught him by the arms and held him, while one pulled off his pants. He yelled at me to help him, but it was such a funny sight I could do nothing but laugh. The Klutcher fixed his pants in good shape, and was well pleased when I presented her with three old, red handkerchiefs. We found them very pleasant

and sociable. We would sing and they would sing. They knew such songs as "John Brown's Body," "Marching Through Georgia," and "A Hot Time in the Old Town." They had some cheap accordions. Some of them had cast-iron cooking stoves, which they did not use, preferring the camp fire. The women do all the work. No matter how often the buck goes out he must have a cup of tea. The buck eats first. What is left after the women eat is flung to the children and the dogs. I saw a child about four years old fighting with a dog for a piece of dried salmon. One of the bucks became angry because I took the salmon away from the dog and gave it to the child. They think more of their dogs than they do of their children. I have seen them stop and lift a dog out of the way and then kick the children.

In cold weather the bucks live in stone houses, about 8 by 10, dug out and covered with logs and earth. You are obliged to go in feet first, and when once in, with ten or twelve bucks, who have nothing on them, you are very glad to get out. They do not allow their women in the stone house, but compel them to sleep in the living room with the dogs and children. We always slept on top of the benches, over the Klutches. The only Indian we found who lived like a white man was the one we stopped with at Taral. All of them had their own chinaware and a box to keep it in. There are about eight or ten families in each shack. The Indian whose bench is on the right side of the camp fire when you enter considers you his guest, and will feed you, but the one on the other side will not. All the bucks are sickly, looking like consumptives. The women, as a rule, are healthy looking. They wear but one garment, something like a long shirt. It is open as far down as the waist and extends a little below the knees. A pair of moccasins is also worn, which reach above the knees. This comprises the dress of the women and children. The bucks dress up in various styles. Some wear mackinaw cloths, others wear what the white men give them. One buck had on three hats, which were telescoped. They all have .45–90 rifles and cheap .32-caliber revolvers, but no cartridges. They would not eat horse meat, but took the skin off of every horse we shot. We found them very honest. They wanted to see and handle everything we possessed, but would not take anything. The Indians wanted to know if McKinley was hi-you white chief.

The Indians at the mouth of the Kotsena River had some good pieces of copper, which they told me they got at hi-you rock on the Kotsena and Chettyna rivers. The country traveled through down at Wood Canyon was pretty rough, but well wooded, with large quantities of grass in places. When I left Copper Center for Valdez the snow was about 39 inches deep. At the lake it was about 5 feet deep, at Twelve-Mile Camp about 15 feet deep, and at the foot of the glacier I could not find bottom. Judging from appearances, it must have been 20 feet deep. Compared with last winter, I found very little snow on the glacier when I crossed it. Coming over the fourth bench, the ice ridge was not covered. I broke through in one place between two ridges, and found only 2 or 3 inches of snow bridging the crevasse. While I was in the inside I did not mind the cold very much. I came out to Valdez with the same rig I had on at the Center, and felt the cold more than I did on the inside. They told me the lowest the mercury fell at Valdez was 8° below zero.

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